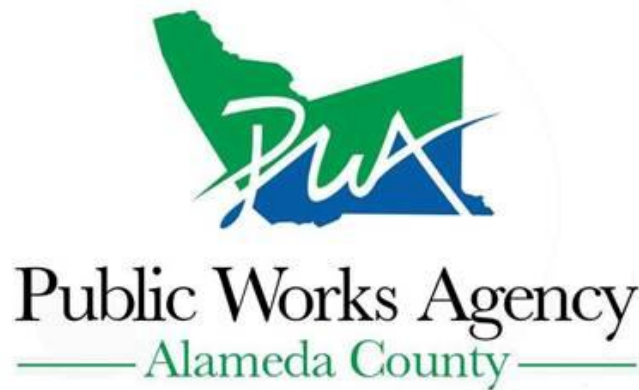




Roadway Improvements at the Intersection of Villareal Drive and Greenville Place Castro Valley, Alameda County, California

- ☐ **Notice to Bidders**
- ☐ **Bid Book**
- ☐ **Revised Standard Specifications
with Special Provisions**
- ☐ **Informational Handouts**

under
Caltrans Standard Specifications 2018

See Notice to Bidders for:

- Bid Opening Date
- Subcontracting Goal
- Mandatory Pre-Bid Meeting Date
- Contractor License Requirement
- Number of Working Days

See Bid Book for:

- Bid Item List

See Special Notices for:

- Important Provisions
- Bid Inquiry Instructions

**Bid Solicitation Authorized on:
July 28, 2020**

SPECIAL NOTICES

- See section [3-1.09](#) for requirements pertaining to **trucking work**
- See section [3-1.10](#) for requirement to utilize **Elations Systems** online contract and labor compliance management system.
- See section [5-1.02](#) for governing **ranking of Contract parts** should there be a discrepancy
- See section [8-1.05](#) for allotment of **Working Days**
- See section [8-1.09](#) for requirement to utilize **Virtual Project Manager**
- See section [10-1.03](#) for **time** constraints
- See section [12-4.01A\(1\)](#) for **traffic control plan** requirement

Submit prebid questions by email at least five business days before the bid opening date to both: tam@acpwa.org and james@acpwa.org

Questions received and the corresponding answers will be posted online at: <https://www.acpwa.org/bidder-information>.

One or more addendums that clarify or revise contract documents may be issued.

Roadway Improvements at the Intersection of Villareal Drive and Greenville Place Castro Valley, Alameda County, California

These project specifications have been prepared under
the direction of and have subsequently been approved by:



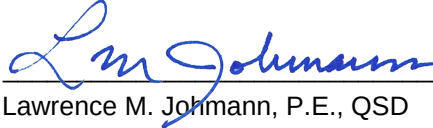
Daniel Woldeesenbet, Ph.D., P.E. 8/27/20 Date

Director of Public Works, County Engineer
Civil Engineer License No. 60306
Alameda County Public Works Agency
951 Turner Court, Room 300
Hayward, CA 94545



Roadway Improvements at the Intersection of Villareal Drive and Greenville Place Castro Valley, California, California

The special provisions contained herein have been
prepared by or under the direction of the following

 7/28/2020

Lawrence M. Johmann, P.E., QSD Date



On July 28, 2020, the Alameda County Board of Supervisors approved this invitation for bids to provide all labor, material, equipment, mechanical workmanship, transportation, and services required for work to be performed on:

**ROADWAY IMPROVEMENTS
AT THE INTERSECTION OF VILLAREAL DRIVE AND GREENVILLE PLACE
CASTRO VALLEY, ALAMEDA COUNTY, CALIFORNIA**

GENERAL WORK DESCRIPTION: Project consists of providing traffic control and construction area signs; providing and implementing water pollution control plan; upgrading the existing sidewalk, curb, gutter, pedestrian ramps, and street lights; and installing bulb-outs, bio-retention areas, Class II buffered bike lane, and high-visibility crosswalk markings at the intersection of Villareal Drive and Greenville Place in Castro Valley, Alameda County, California.

This project is subject to all Local, State, and Federal laws, rules and guidelines contained in the plans and specifications, including but not limited to payment of prevailing wages. These wage rates are available at the Alameda County Public Works Agency's office. Contractors and subcontractors must be currently registered and qualified to perform public works contracts pursuant to Labor Code Section 1725.5.

LICENSE REQUIREMENT: The Contractor must have a Class A license at the time of bid opening. Licensing must be maintained throughout the Contract duration.

REGISTRATION REQUIREMENT: To be qualified to bid or to be listed in a bid proposal, all contractors must be registered with the Department of Industrial Relations.

BIDS DUE: Tuesday, October 6, 2020, 2:00 p.m., at the Public Works Agency, 951 Turner Ct, Rm 300, Hayward, CA 94545. Bids submitted after this deadline will be rejected. Submissions accepted prior will be publicly open and read immediately following the deadline. Include a bidder's security equal to at least 10 percent of the bid. Direct questions regarding bid submission to 510-670-5450.

PREBID MEETING: There is a pre-bid meeting for all prime contractors. Interested subcontractors are invited and encouraged to attend. The pre-bid meeting has been scheduled on Thursday, September 10, 2020 at 2 p.m. at 951 Turner Ct, Rm 230, Hayward, CA 94545.

COVID-19: Due to COVID-19, the Public Works Agency will be following the County Health Officer's latest Shelter In Place Order or other applicable orders and guidance concerning social distancing, if any, in place during the bid process. Pre-bid meetings and the Bid Opening may be limited to one attendee per company, and may take place in several rooms with Agency personnel teleconferencing from a separate room.

SUBCONTRACTING GOALS: 15% to Minority Owned Businesses and 5% to Women Owned Businesses. Submit the M/WBE Commitment, Information, and Good Faith Effort Checklist forms with the Bid. Submit good faith documentation no later than 2:00 p.m. on the second business day following bid opening.

Alameda County strongly encourages the participation of disadvantaged/minority/women owned businesses in public works projects and the hiring of apprentices who reside within the County. For more information about the Construction Compliance Program call 510-670-6601. For information about the Alameda County Contractor Technical Assistance Program (CTAP), email: CTAP@imwis.com.

WAGES: Contractors must not pay less than the general prevailing rate of per diem wages to all workers. Copies of the required prevailing rates are on file at the Agency location where bids are due.

PLANS AND SPECIFICATIONS: View and purchase at www.ipdservices.com/clients/eastbay?ALCO or at:

- East Bay Blueprint, 1745 14th Ave, Oakland, 510-261-2990
- Central Blueprint, 17132 East 14th St, Hayward, 510-276-3375
- Custom Blueprint, 1944 Mt. Diablo Blvd, Walnut Creek, 925-932-3113

Submit bid questions as described in the Special Notices that accompany the Special Provisions. Questions not submitted 5 days before bid opening will not be considered for or treated as bid protests.

The Board of Supervisors reserves the right to reject any or all bids and any or all items of such bids.

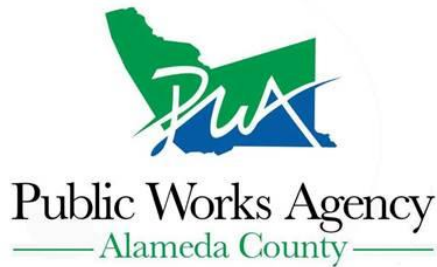
BY ORDER OF THE BOARD OF SUPERVISORS,
COUNTY OF ALAMEDA, STATE OF CALIFORNIA
ON TUESDAY, July 28, 2020

The map displays the project location in the Eden Canyon area. A north arrow is located in the upper right corner. The project location is marked with a black square and labeled "PROJECT LOCATION". The map shows various streets including BUREN PL, MORTON PL, LAMAR LP, GREENVILLE PL, LONGMONT LP, COOLIDGE CT, JENSEN DR, VILLAREAL DR, DENISON PL, PINEVILLE CI, CALDWELL CT, PRINCETON PL, EDEN CANYON RD, HOLLIS CANYON RD, EAST CASTRO VALLEY BL, GRASSLANDS DR, SUNNYSLOPE AV, GREENWOOD CIR, EDGEWOOD CIR, EDGEWOOD WY, RIDGEWOOD DR, VILLAREAL DR, GLENWOOD, CRESTWOOD DR, HUNTERS KNOLLS, CYPRESS RANCH RD, JENSEN RD, KNUPE PL, CARSON LN, JASPER DR, LASSEN MT, EDWIN DR, MARKHAM DR, DANA CT, KIT LN, JESSE CT, WOOSTER CT, BOWIE WY, CLEVENT, MASTERTSON PL, BUREN PL, GREENVILLE PL, LONGMONT LP, COOLIDGE CT, JENSEN DR, VILLAREAL DR, DENISON PL, PINEVILLE CI, CALDWELL CT, PRINCETON PL, EDEN CANYON RD, HOLLIS CANYON RD, EAST CASTRO VALLEY BL, GRASSLANDS DR, SUNNYSLOPE AV, GREENWOOD CIR, EDGEWOOD CIR, EDGEWOOD WY, RIDGEWOOD DR, VILLAREAL DR, GLENWOOD, CRESTWOOD DR, HUNTERS KNOLLS, CYPRESS RANCH RD, JENSEN RD, KNUPE PL, CARSON LN, JASPER DR, LASSEN MT, EDWIN DR, MARKHAM DR, DANA CT, KIT LN, JESSE CT, WOOSTER CT, BOWIE WY, CLEVENT, MASTERTSON PL. A legend in the upper right corner lists the following locations: 1. SUMMERGLEN PL, 2. SUMMERGLEN TE, 3. SUMMERCREST DR, 4. SUMMERHILL PL, 5. SUMMERRIDGE DR, 6. SUMMERPOINTE PL, 7. SUMMERPARK PL. A scale bar in the lower left corner indicates a distance of 580 feet.

SPEC NO. 2289

**ROADWAY IMPROVEMENTS
AT THE INTERSECTION OF VILLAREAL DRIVE AND GREENVILLE PLACE
CASTRO VALLEY, ALAMEDA COUNTY, CALIFORNIA
LOCATION MAP**

DRAWN	CHECKED	DATE	SCALE	FILE NO.	SHEET NO.
J RINGOT	T NGUYEN	JUNE 2020	NTS	—	L-1



BID BOOK

Bid Proposal for

Roadway Improvements at the Intersection of Villareal Drive and Greenville Place Castro Valley, Alameda County, California

Name of Bidder: _____

Mailing Address: _____

Physical Address: _____

Telephone: _____ Email: _____

Contractor License No.: _____ DIR No.: _____

Alameda County Public Works Agency will accept securely sealed bids deposited in the bid box located in Room 300 at 951 Turner Court, Hayward, CA until the date and time specified in the Notice to Bidders or as amended by Addendum.

A bid is considered securely sealed if the envelope that contains it is completely closed and held shut with any form of adhesive that prevents its opening without creating evidence of tampering. Any bid that is improperly sealed will be rejected and returned to the bidder.

The official time clock for receiving bids is the clock located adjacent to the bid box. It is the sole responsibility of the bidder to observe the time in order to complete the bid submittal procedure. No bids may be removed by any bidder from the bid box once deposited.

GENERAL INSTRUCTIONS

A. Confirm your qualifications as a responsible bidder.

- ☐ 1. Did not already provide architectural or engineering services for the contract ([§2-1.02](#)).
- ☐ 2. Can certify compliance with the Iran Contracting Act of 2010 if bid is to be over \$1M ([§2-1.02](#)).
- ☐ 3. ~~Did or will attend a pre-bid outreach meeting as scheduled in the Notice to Bidders~~ ([§2-1.04](#)).
- ☐ 4. Can achieve subcontracting goals specified in the Notice to Bidders or can demonstrate a good faith effort toward the attempt. ([§2-1.12](#) for Federal-Aid projects / [§2-1.13](#) for Non-Federal Aid projects)
- ☐ 5. Registered with the Department of Industrial Relations if bid is to be over \$25,000 ([§3-1.03](#)).
- ☐ 6. Licensed California contractor of the classification specified in the Notice to Bidders ([§3-1.06](#)).
- ☐ 7. Party to, or intend to become a party to, the Alameda County Project Stabilization/Community Benefits Agreement for Non-Federal-Aid projects ([§3-1.09](#)).
- ☐ 8. Not currently sanctioned as ineligible by the Alameda County Board of Supervisors for non-conformance with the requirements of another contract ([§3-1.10D](#)).
- ☐ 9. Can perform work equaling at least 50-percent of the value of the total bid with own employees and owned/rented equipment ([§5-1.13A](#)).

B. Familiarize yourself with the Contract documents and requirements.

Section [3-1.18](#), "Contract Execution," provides a sample contract.

Upon execution of the Contract, your Bid Proposal, the *Special Provisions*, Project Plans, *Standard Specifications*, Standard Details, Revised Standard Plans, Standard Plans, and any supplemental project information all become components of the Contract. Section [5-1.02](#), "Contract Components," describes the governing ranking of Contract parts.

The Contract's *Special Provisions* are based upon Caltrans 2018 construction standards. As such, they are organized in a similar manner and are to be interpreted in a similar way as if they were issued under a State transportation contract.

If unfamiliar with Caltrans construction standards, it may be beneficial to review the State's training webpage: <http://www.dot.ca.gov/hq/construc/training-page.html>

C. Submit a responsive bid.

Provisions pertaining to the bidding process are in section 2.

In summary:

- ☐ 1. Attend the mandatory pre-bid outreach meeting and sign the attendance sheet.
- ☐ 2. Arrange to meet subcontracting goals or make a good faith effort in the attempt.
- ☐ 3. Submit a sealed bid that includes a bidder's security as described under section [2-1.34](#), "Bidder's Security," to the location and by the deadline specified in the Notice to Bidders.

D. Be Prepared to Submit Prerequisite Documents for Contract Award

If you are determined to be the lowest responsible bidder, you will need to submit a:

- ☐ Payment bond ([§3-1.05](#), sample bond form provided under [§3-1.18](#))
- ☐ Performance bond ([§3-1.05](#), sample bond form provided under [§3-1.18](#))
- ☐ Commercial general liability insurance policy and an excess policy ([§3-1.07](#))
- ☐ Certificate of Insurance showing all other required coverages ([§3-1.07](#))
- ☐ CPA Certification of sufficient resources for self-insured retentions—if applicable ([§3-1.07](#))

INSTRUCTIONS FOR COMPLETING THE PROPOSAL

The work for which this proposal is submitted is for construction in conformance with the special provisions, associated project plans, including any addenda thereto, the contract, and also in conformance with Current Caltrans Standard Plans, Standard Specifications, and the Labor Surcharge and Equipment Rental Rates in effect on the date the work is accomplished.

Specifications include the payment of not less than the State general prevailing wage rates for Non-Federal-Aid projects or not less than the State general prevailing wage rates or Federal minimum wage rates for Federal-Aid projects.

Bids are to be submitted for the entire work. The amount of the bid for comparison purposes will be the total of all items. The prices bid shall include any Federal or State Tax payable on articles to be furnished under the contract.

The bidders shall carefully examine the Contract Documents and satisfy themselves as to the sufficiency thereof. Should any discrepancies or omissions in the Contract Documents be discovered, bidders shall report such discovery immediately to the Engineer for a decision; and shall not, at any time after the submission of the bids, dispute or complain of such Contract Documents and the directions explaining them or interpreting them, nor assert that there is any misunderstanding in regard to the location, extent, nature or amount of work to be performed.

Bidders are presumed to have visited and inspected the site of the work and familiarized themselves with the conditions existing there, as well as all other conditions relating to the construction and labor under which the work will be performed. The submittal of a bid will be considered an acknowledgment on the part of the bidder of familiarity with conditions at the site of the work.

Bidders seeking explanations concerning any portion of the work during the time of estimating may submit questions as described under the Special Notices that accompany the *Revised Standard Specifications with Special Provisions*.

Quantities on the Bid Item List are approximate and given for the purpose of comparing bids only. A quantity designated as a final quantity shall be the quantity for which payment will be made unless the work as shown is revised by the Engineer. The Agency does not expressly or by implication agree or guarantee that the actual amount of work will correspond to the preliminary estimate or to the quantities set forth, but reserves the right, insofar as authorized by law, to increase or decrease the amount of any class or portion of the work, or to omit portions of the work as may be deemed necessary or expedient by the Engineer.

The Bidder shall make his own estimates as to required quantities based upon the Contract Documents and his examination of the site of work. Work, complete and in place, will be paid for on the unit price basis as set forth in the Bidder's bid proposal for work actually done and as outlined in the Contract Documents. The Bidder must include in his bid price the furnishing of all labor, material, and equipment, and the performance of all work necessary to make a complete job regardless of any omission of details in the Contract Documents.

The bidder shall set forth for each unit basis item of work a unit price and a total for the item, and for each lump sum item a total for the item, all in clearly legible figures in the respective spaces provided for that purpose. In the case of unit basis items, the amount set forth under the "Item Total" column shall be the product of the unit price bid and the estimated quantity for the item.

In case of discrepancy between the unit price and the total set forth for a unit basis item, the unit price shall prevail, except as provided in (a) or (b), as follows:

- a) If the amount set forth as a unit price is unreadable or otherwise unclear, or is omitted, or is the same as the amount of the entry in the item total column, then the amount set forth in the item total column for the item shall prevail and shall be divided by the estimated quantity for the item and the price thus obtained shall be the unit price;

- b) (Decimal Errors) If the product of the entered unit price and the estimated quantity is exactly off by a factor of ten, one hundred, etc., or one-tenth, or one-hundredth, etc. from the entered total, the discrepancy will be resolved by using the entered unit price or item total, whichever most closely approximates percentage-wise the unit price or item total in the Agency's final Engineer's Estimate of cost.

If both the unit price and the item total are unreadable or otherwise unclear, or are omitted, the bid may be deemed irregular. Likewise if the item total for a lump sum item is unreadable or otherwise unclear, or is omitted, the bid may be deemed irregular unless the project being bid has only a single item and a clear, readable total bid is provided.

Symbols such as commas and dollar signs will be ignored and have no mathematical significance in establishing any unit price or item total or lump sums. Written unit prices, item totals and lump sums will be interpreted according to the number of digits and, if applicable, decimal placement. Cents symbols also have no significance in establishing any unit price or item total since all figures are assumed to be expressed in dollars and/or decimal fractions of a dollar. Bids on lump sum items shall be item totals only; if any unit price for a lump sum item is included in a bid and it differs from the item total, the item's total shall prevail.

The foregoing provisions for the resolution of specific irregularities cannot be so comprehensive as to cover every omission, inconsistency, error or other irregularity which may occur in a bid. Any situation not specifically provided for will be determined in the discretion of the Agency, and that discretion will be exercised in the manner deemed by the Agency to best protect the public interest in the prompt and economical completion of the work. The decision of the Agency respecting the amount of the bid, or the existence or treatment of an irregularity in a bid, shall be final.

If this proposal shall be accepted and the undersigned shall fail to enter into the contract and furnish the 2 bonds in the sums required by the State Contract Act, with surety satisfactory to the Agency, within 8 days, not including Saturdays, Sundays and legal holidays, after the bidder has received notice from the Agency that the contract has been awarded, the Agency may, at its option, determine that the bidder has abandoned the contract, and thereupon this proposal and the acceptance thereof shall be null and void and the forfeiture of the security accompanying this proposal shall operate and the same shall be the property of the Alameda County.

The undersigned, as bidder, declares that the only persons or parties interested in this proposal as principals are those named herein; that this proposal is made without collusion with any other person, firm, or corporation; that he has carefully examined the location of the proposed work, the proposed form of contract, and associated plans; and he proposes, and agrees if this proposal is accepted, that he will contract with the Alameda County, in the form of the copy of the contract annexed hereto, to provide all necessary machinery, tools, apparatus and other means of construction, and to do all the work and furnish all the materials specified in the contract, in the manner and time therein prescribed, and according to the requirements of the Engineer as therein set forth, and that he will take in full payment therefore the following prices, to wit:

BID ITEM LIST

No.	Sec/Code	Bid Item Description	Qty	Unit	Unit Cost	Total Cost
PREPARATORY WORK						
1	§7-1.02K 074018	Excavation Safety Plan (Labor Code §6707)	1	LS	\$	\$
2	§9-1.16D 999990	Mobilization	1	LS	\$	\$
TEMPORARY TRAFFIC CONTROL						
3	§12 120100	Traffic Control System	1	LS	\$	\$
WATER POLLUTION CONTROL WORK						
4	§13-2 130200-E	Prepare Water Pollution Control Plan – CGP Exempt	1	LS	\$	\$
5	§13-4 130100	Job Site Management	1	LS	\$	\$
6	§13-6.03C 130620	Temporary Drainage Inlet Protection	9	EA	\$	\$
7	§13-7.02 130730	Street Sweeping	1	LS	\$	\$
8	§13-9 130900	Temporary Concrete Washout	1	LS	\$	\$
CLEARING IMPEDIMENTS						
9	§17-2 170103	Clearing and Grubbing (LS)	1	LS	\$	\$
LANDSCAPE						
10	§20-3.01B 204035	Plant (Ground Cover & Shrubs – 1 Gal)	135	EA	\$	\$
11	§20-3.01B 204036	Plant (Ground Cover & Shrubs – 5 Gal)	62	EA	\$	\$
12	§20-5.03B 200114	Rock Blanket (Cobbles in Concrete)	214	SF	\$	\$
13	§20-5.03E 200113	Rock Mulch (Loose Cobbles)	36	SF	\$	\$
14	§20-5.04 205035	Wood Mulch	810	SF	\$	\$
SURFACINGS AND PAVEMENTS						
15	§39-2.01 39	HMA Plug / Pavement Tie In	1,652	SF	\$	\$
16	§39-3 398001	Remove Asphalt Concrete Pavement (4,433-sf x 0.45-ft±)	2,000	CF	\$	\$
STRUCTURES						
17	§51 510050-B	Structural Concrete, Bioretention Structure	1	LS	\$	\$
18	§51-7 510502	Minor Concrete (Trench Drain) [Plan Sheet 11 Detail 3]	1	EA	\$	\$

*Contingent item under section 2-1.09B

No.	Sec/Code	Bid Item Description	Qty	Unit	Unit Cost	Total Cost
DRAINAGE FACILITIES						
19	§68-2.02F 682049	Class 2 Permeable Base	3	CY	\$	\$
20	§68-2.02F 682008-B	Bioretention Soil Mix	5	CY	\$	\$
21	§71-4 710250	Modify Inlet to Manhole [SD-422]	1	EA	\$	\$
22*	§71-5 710212	Adjust Manhole to Grade	1	EA	\$	\$
CONCRETE CURBS & SIDEWALKS						
23	§73 731504-A	Minor Concrete (Curb and Gutter)	402	LF	\$	\$
24	§73 731521-A	Minor Concrete (Sidewalk)	2,860	SF	\$	\$
25	§73 731623-A	Minor Concrete (Curb Ramp)	435	SF	\$	\$
26	§73 731840	Remove Concrete (Curb and Gutter)	646	LF	\$	\$
27	§73 731760-A	Remove Concrete Curb Ramp and Sidewalk	2,405	SF	\$	\$
LOCAL INFRASTRUCTURE						
28*	§77 710218-E	Adjust Water Valve Box – EBMUD	1	EA	\$	\$
ROADSIDE SIGNS						
29	§82-3 820840	Roadside Sign – One Post	6	EA	\$	\$
30	§82-9 820590	Relocate Roadside Sign-One Post	2	EA	\$	\$
TRAFFIC STRIPES AND PAVEMENT MARKINGS						
31	§84-2 840502	Thermoplastic Traffic Stripe (Enhanced Wet Night Visibility)	3,500	LF	\$	\$
32	§84-2 840516	Thermoplastic Pavement Marking (Enhanced Wet Night Visibility)	130	SF	\$	\$
ELECTRICAL SYSTEMS						
33	§87 870200	Lighting System	1	LS	\$	\$
PROJECT WRAP-UP						
34	§20-4 204099	Plant Establishment Work (3-years)	1	LS	\$	\$

Total Bid: _____ **Dollars \$** _____
(in words)

*Contingent item under section 2-1.09B

The prices bid include furnishing the resources and activities required to complete the work. Payment is full compensation for furnishing the resources and activities as described under section [9-1.03](#).

Links to section numbers are provided for convenience only. Specifications found under the referenced sections are not the only specification that apply to the Bid Item as described under section [1-1.01](#).

Most bid Item codes (without the hyphenated suffix) and descriptions are similar to, but not necessarily the same as, Caltrans Standard Bid Item codes and descriptions. This information when queried at the following webpage may be useful for estimating costs: <http://sv08data.dot.ca.gov/contractcost>

*Contingent item under section 2-1.09B

BUSINESS TYPE

Identify business type by checking the appropriate box and providing supporting information.

Please ensure that all responses are legible.

☐ **Bidder is an Individual**

Bidder's name as it appears on State Contractor's License: _____

☐ **Bidder is an Individual doing business under a fictitious name**

Bidder's individual name and firm name as they appear on the State Contractor's License are:

Individual Name: _____

Doing Business As: _____

☐ **Bidder is a Co-Partnership**

Bidder's firm name as it appears on State Contractor's License: _____

The full names of all the partners as they appear on each State Contractor's License:

☐ **Bidder is a Corporation**

The corporation name as it appears on State Contractor's License: _____

The corporation is incorporated in the State of _____

The full names of all the principals of the corporation are:

NONCOLLUSION DECLARATION

(to be executed by Bidder and submitted with Bid)

The undersigned declares:

I am the _____ of _____, the party making the foregoing bid.

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham.

The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid.

The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding.

The bidder has not in any manner, directly or indirectly, sought an agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder.

All statements contained in the bid are true.

The bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on _____ (date), at _____ (city), _____ (state).

Printed Name

Signature

IRAN CONTRACTING ACT CERTIFICATION

(For local and Federal-Aid projects)

Public Contract Code Section 2200-2208 Statement • Iran Contracting Act

In conformance with Public Contract Code Section 2200-2208, the Contractor, hereby states under penalty of perjury, that it is not prohibited from submitting this bid by the provisions of the Iran Contracting Act of 2010.

NOTE: The above certification is part of the Proposal. Signing this Proposal on the signature portion thereof shall also constitute signature of this Certification. Providing a false certification will result in referral to the Attorney General for prosecution and imposition of substantial civil penalties up to twice the contract value and a prohibition from bidding on public entity contracts for a period of three years. Providing a false certification may result in termination of an awarded contract.

SUBCONTRACTOR COMMITMENT

In accordance with California Public Contract Code, [Section 4104](#) and the Code of Federal Regulations, [Title 49, Section 26.11](#), the following information is required for each sub-contractor who will perform work amounting to more than one half of one percent (0.5%) of the Total Base Bid or \$10,000 (whichever is greater).

		▼ For Federal Aid Projects ▼
Name:		Age of Firm:
Address:		If DBE, DBE Certification No.:
Contractor License No.:	DIR No.:	
Bid Item No. & Description:		Annual Gross Receipts:
		☐ <\$1M ☐ <\$5M
Percent Subcontracted:	Subcontract Amount:	☐ <\$10M ☐ <\$15M
Name:		Age of Firm:
Address:		If DBE, DBE Certification No.:
Contractor License No.:	DIR No.:	
Bid Item No. & Description:		Annual Gross Receipts:
		☐ <\$1M ☐ <\$5M
Percent Subcontracted:	Subcontract Amount:	☐ <\$10M ☐ <\$15M
Name:		Age of Firm:
Address:		If DBE, DBE Certification No.:
Contractor License No.:	DIR No.:	
Bid Item No. & Description:		Annual Gross Receipts:
		☐ <\$1M ☐ <\$5M
Percent Subcontracted:	Subcontract Amount:	☐ <\$10M ☐ <\$15M
Name:		Age of Firm:
Address:		If DBE, DBE Certification No.:
Contractor License No.:	DIR No.:	
Bid Item No. & Description:		Annual Gross Receipts:
		☐ <\$1M ☐ <\$5M
Percent Subcontracted:	Subcontract Amount:	☐ <\$10M ☐ <\$15M
Name:		Age of Firm:
Address:		If DBE, DBE Certification No.:
Contractor License No.:	DIR No.:	
Bid Item No. & Description:		Annual Gross Receipts:
		☐ <\$1M ☐ <\$5M
Percent Subcontracted:	Subcontract Amount:	☐ <\$10M ☐ <\$15M
Name:		Age of Firm:
Address:		If DBE, DBE Certification No.:
Contractor License No.:	DIR No.:	
Bid Item No. & Description:		Annual Gross Receipts:
		☐ <\$1M ☐ <\$5M
Percent Subcontracted:	Subcontract Amount:	☐ <\$10M ☐ <\$15M

Continued on the reverse.

▲ For Federal Aid Projects ▲

SUBCONTRACTOR COMMITMENT

Continued from the previous page.

Continued from the previous page.		▼ For Federal Aid Projects ▼	
Name:		Age of Firm:	
Address:		If DBE, DBE Certification No.:	
Contractor License No.:	DIR No.:		
Bid Item No. & Description:		Annual Gross Receipts:	
		☐ <\$1M ☐ <\$5M	
Percent Subcontracted:		Subcontract Amount:	
		☐ <\$10M ☐ <\$15M	

Name:	Age of Firm:
Address:	If DBE, DBE Certification No.:
Contractor License No.: DIR No.:	
Bid Item No. & Description:	Annual Gross Receipts: ☐ <\$1M ☐ <\$5M
Percent Subcontracted: Subcontract Amount:	☐ <\$10M ☐ <\$15M

Name:	Age of Firm:
Address:	If DBE, DBE Certification No.:
Contractor License No.: DIR No.:	
Bid Item No. & Description:	Annual Gross Receipts: ☐ <\$1M ☐ <\$5M
Percent Subcontracted: Subcontract Amount:	☐ <\$10M ☐ <\$15M

Name:	Age of Firm:
Address:	If DBE, DBE Certification No.:
Contractor License No.: DIR No.:	
Bid Item No. & Description:	Annual Gross Receipts: ☐ <\$1M ☐ <\$5M
Percent Subcontracted: Subcontract Amount:	☐ <\$10M ☐ <\$15M
	▲ For Federal Aid Projects ▲

Total amount to be subcontracted:

Bid minus designated speciality items performed by subcontract:

Under section 5-1.13, “Subcontracting,” you must perform work equaling at least 50-percent of the value of the original total bid with your employees and with equipment you own or rent, with or without operators, except that any designated speciality items may be performed by subcontract and the amount of any designated speciality items performed by subcontract may be deducted from the original total contract price before computing the amount of work required to be performed by you.

Photocopy this form, if additional space is needed.

[This form derived from Caltrans Local Assistance Procedures Manual – Exhibit 12-B Part 1 – 01/2019]

MINORITY-OWNED/WOMAN-OWNED BUSINESS ENTERPRISE (M/WBE) COMMITMENT FORM
(for locally funded projects)

ACPWA Contract Compliance Program 510-670-6601

SPEC NO. _____ BID OPENING DATE _____ BIDDER _____

PROJECT NAME _____

BIDDER REPRESENTATIVE COMPLETING THIS FORM:

NAME _____ EMAIL _____ PHONE NUMBER _____

NAME OF M/WBE	CERTIFIED BY	CERTIFICATION FILE NO.	DESCRIPTION OF WORK	BID ITEM	MBE MINORITY	WBE	DOLLAR VALUE OF CONTRACT

MBE BID AMOUNT \$ _____ = REQUIREMENT ACHIEVED _____ % REQUIREMENT ASSIGNED _____ %

WBE BID AMOUNT \$ _____ = REQUIREMENT ACHIEVED _____ % REQUIREMENT ASSIGNED _____ %

For suppliers, list full dollar value. Goal credit for non-manufacturing suppliers will be calculated at 60-percent of full dollar value.

MINORITY-OWNED/WOMAN-OWNED BUSINESS ENTERPRISE INFORMATION FORM
(for locally funded projects)

ACPWA Contract Compliance Program 510-670-6601

For each firm listed on the commitment form, provide the information specified by the column headings below.

NAME OF MBE/WBE	ADDRESS	LICENSE	DIR REG. NO.	FED TAX ID NO.	PHONE	FAX

GOOD FAITH EFFORT TOWARD ACHIEVING M/WBE GOALS

(for locally funded projects)

To be completed by all by bidders for all contracts of \$100,000 and greater.

Name of Bidder (please print legibly): _____

Initial beside each action taken:

_____ Bidder attended the Project pre-bid meeting.

_____ Bidder identified specific items of the Project to be performed by Minority-owned Business Enterprises and Women-owned Business Enterprises (M/WBE).

_____ Bidder advertised, not less than 10 calendar days before the bid opening date in one or more daily or weekly newspapers, trade association publications, minority or trade oriented publications, trade journals, or other media, as specified by ACPWA, for M/WBEs interested in participating in the project.

_____ Publication name where ad was placed

_____ Date(s) advertisement appeared

_____ Bidder provided written notice of his/her interest in bidding on the contract to M/WBEs at least 10 calendar days prior to the opening of bids.

_____ Bidder followed up initial solicitations of interest by contacting M/WBEs to determine, with certainty, whether enterprises were interested in performing specific items of the project.

_____ Bidder provided interested M/WBEs with information about the plans, specifications, and requirements for the selected subcontracting of material supply work.

_____ Bidder requested assistance from community organizations; M/WBE contractor groups; and/or other organizations that provide assistance in the recruitment and placement of M/WBEs as they are available.

_____ Bidder negotiated in good faith with M/WBEs and did not unjustifiably reject as unsatisfactory bids prepared by any M/WBEs.

_____ Bidder advised and made efforts to assist interested M/WBEs in obtaining bonds, lines of credit or insurance required by either the Agency or the Contractor.

Bidder certifies that all actions marked on the checklist were performed by the Bidder prior to the bid opening date. Failure to complete the above checklist may result in finding the proposal to be non-responsive, subject to the Board of Supervisors' determination. This checklist is provided as a courtesy to the bidder and is not intended to be a waiver of or modification to any of the Specifications included in the Contract documents. The undersigned states that the representations made herein are made under penalty of perjury.

Name of the Principal of Firm (Print): _____

Signature of the Principal of the Firm: _____

SIGNATURE PAGE

The Bidder has verified the total number of addenda issued prior to bid submittal and has listed them all below. The Bidder acknowledges the changes made in these addenda and that this Bid is made with consideration of these changes. Failure to acknowledge all issued addenda may result in finding the Proposal to be non-responsive, subject to the Board of Supervisors' determination.

Addendum No. _____ Date _____	Addendum No. _____ Date _____
Addendum No. _____ Date _____	Addendum No. _____ Date _____
Addendum No. _____ Date _____	Addendum No. _____ Date _____
Addendum No. _____ Date _____	Addendum No. _____ Date _____

The undersigned is licensed by the State Contractor's License Board of the State of California to perform the work hereinbefore describes and holds

State Contractor's License No. _____ Classification _____ Expiration Date _____

The Business & Professions Code Section 7028.15 requires the listing of the license and expiration date for consideration of the bid proposal for Non-Federal Aid projects.

By my signature on this proposal, I certify, under penalty of perjury under the law of the State of California, that the representations made herein are true and correct.

Signature

Date

Printed Name

Bidder's Business Name

Title

Business Street Address

Phone

Email

Business City and Zip

BID BOND

(Bidders must complete and submit this form, not a surety company form)

KNOW ALL PERSONS BY THESE PRESENTS;

That the undersigned, _____, as PRINCIPAL, and
_____ a corporation organized and existing under and by virtue
of the laws of the State of _____ and authorized to do business in the State of California,
as SURETY, are hereby held and firmly bound unto the COUNTY OF ALAMEDA in an amount equal to at
least ten percent of the amount bid (including base bid, pre-bid amounts, allowances, and alternates);

_____ Dollars (_____)
lawful money of the United States of America, for the payment of which sum well and truly to be made as
agreed and liquidated damages, we and each of us, bind ourselves, our heirs, executors, administrators,
successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT whereas the PRINCIPAL has submitted to the
COUNTY OF ALAMEDA, a certain bid for work required for the project titled:

which work is specifically described in the accompanying bid.

NOW, THEREFORE,
if said bid shall be rejected, or in the alternate, if said bid shall be accepted and the PRINCIPAL, within
the time and in the manner described under the specifications, enters into a written contract in
accordance with the bid and files the two bonds, one guaranteeing faithful performance of the work to be
done and the other guaranteeing payment for labor and materials, as required by law, then the obligation
shall be null and void, otherwise, the same shall remain in full force and effect.

The SURETY, for value received, hereby stipulates and agrees that the obligation of said SURETY and
its bond shall be in no way impaired or affected by an extension of the time within which the COUNTY of
ALAMEDA may accept such bid; and said SURETY does hereby waive notice of any such extension.

In the event suit is brought upon this bond by the COUNTY OF ALAMEDA and judgement is recovered,
the SURETY shall pay all costs incurred by the COUNTY OF ALAMEDA in bringing such suit, including a
reasonable attorney's fee to be fixed by the Court.

IN WITNESS WHEREOF,
we have hereunto set our hands and seals this day _____ of _____, _____.

SURETY

PRINCIPAL

By: _____

By: _____



**Roadway Improvements at the Intersection
of Villareal Drive and Greenville Place
Castro Valley, Alameda County, California**

**Revised Standard Specifications
with Special Provisions**

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ORGANIZATION

The Project's specifications are comprised of *Caltrans 2018 Standard Specifications* and the *Revised Standard Specifications with Special Provisions* contained herein.

As with a Caltrans project, *Revised Standard Specifications* and *Special Provisions* begin with a revision clause that describes or introduces a revision to the *Standard Specifications*, such as “**Replace Division I with:...**”

Unlike a Caltrans project, the *Revised Standard Specifications* and *Special Provisions* are combined here into an integrated whole along with much of the *Standard Specification* section that is being modified (except that some nonrelevant subsections may be amended to “Not Used”).

The benefit of this is that you may rely primarily on this one document for interpreting most of the required specifications for the Project. There may be an occasional instance, however, where a referenced standard section is not included here. In which case, refer to the *Caltrans 2018 Standard Specifications*. There may be other instances where standard subsections have been included here that are not entirely or at all relevant to the Project, in which case, the nonrelevant standards should be ignored.

Revised Standard Specifications that have been issued by Caltrans and adopted by the Agency have been included here without any special markings. Whereas, Agency revisions to Caltrans Standards are included here with standard revision marks (except where “Department” or “State” have been replaced with more contextually suitable proper nouns, such as “Agency” or “County”).

When viewed or printed in color, revisions attributed to Agency standards, which are the same for all Agency projects, are presented in bold purple, for example: **Agency additions and Agency deletions**.

Revisions that are project specific, i.e. *Special Provisions*, are presented in bold green, for example: **Project additions and ~~Project deletions~~**.

Should an addendum be issued, addendum revisions will be presented in red.

These distinguishing characteristics are provided for convenience, but are not guaranteed to accurately reflect deviations from Caltrans Standards. It is the Bidder's obligation to be familiar with the requirements of the text presented, regardless of color or underlining.

Replace Division I with:

DIVISION I GENERAL PROVISIONS

1 GENERAL

1-1.01 GENERAL

Section 1 includes specifications related to the interpretation of the contract.

Global revisions are changes to contract documents not specific to a section of the Standard Specifications. In each contract document at each occurrence, interpret the following terms as shown:

Term	Interpretation	Conditions
Fed-Std-595	AMS Std 595	--

The specifications are divided into 12 divisions.

Division I includes general specifications applicable to every contract unless specified as applicable only under certain conditions.

Division II includes specifications for general construction applicable to every contract unless specified as applicable only under certain conditions.

Divisions III through X include construction specifications for specific bid items.

Division XI includes specifications for common materials. For a material specified in this division, that material specified in any section must comply with the specifications in division XI.

Division XII includes construction specifications for buildings.

The bid items set forth the construction specifications that apply. The first 2 digits of a bid item code correspond to the specification section number with the same first 2 digits except for bid item code 999990 that corresponds to section 9 and unless shown otherwise in the [Bid Item List, table titled "Bid Items and Applicable Sections" in the special provisions.](#)

The specifications are written to the Bidder before award and the Contractor after. Before award, interpret sentences written in the imperative mood as starting with *The Bidder must* and interpret *you* as *the Bidder* and *your* as *the Bidder's*. After award, interpret sentences written in the imperative mood as starting with *The Contractor must* and interpret *you* as *the Contractor* and *your* as *the Contractor's*.

After Contract approval, submit documents and direct questions to the Engineer. Orders, authorizations, and requests to the Contractor are by the Engineer.

The following items from the Agency are in writing:

1. Approvals
2. Authorizations
3. Decisions
4. Notifications
5. Orders
6. Responses

The following items from the Contractor must be in writing:

1. Notifications
2. Proposals
3. Reports
4. Requests, including RFIs, sequentially numbered
5. Subcontracts
6. Test results

[Submit written communications to the Project Inspector identified at the preconstruction meeting.](#)

No oral statement by any person will in any manner modify or otherwise affect the terms of the contract.

Where a location is not specified with the words *shown*, *specified*, or *described*, interpret:

1. *Shown* as *shown on the plans*.
2. *Specified* as *specified in the specifications*.
3. *Described* as *described in the Contract*. *Described* means *shown, specified, or both*.

Headings are included for the purposes of organization and referencing. Inclusion of a heading with no related content, *Not Used*, or *Reserved* does not indicate that no specification exists for that subject; applicable specifications may be covered in a general or referenced specification.

Specifications in a section titled *General* apply to all subordinate sections within the section.

Specifications in the general section of a division apply to all sections within the division.

Sections are reserved in the *Standard Specifications* for correlation of special provisions and revised standard specifications with the *Standard Specifications* and for future expansion of the *Standard Specifications*.

The specifications are expressed in US customary units except where a referenced document uses the International System of Units as the standard.

~~Unless an object or activity is specified to be less than the total, the quantity or amount is all of the object or activity.~~

All items in a list apply unless the items are specified as choices.

1-1.02 STYLE VARIATIONS

The Agency is gradually standardizing the style of the specifications. The use of the new style does not change the meaning of a Contract part not using this style. The new style includes:

1. Use of:
 - 1.1. Imperative mood
 - 1.2. Introductory modifiers
 - 1.3. Conditional clauses
 - 1.4. Industry-standard terms
2. Elimination of:
 - 2.1. Language variations
 - 2.2. Definitions for industry-standard terms
 - 2.3. Redundant specifications
 - 2.4. Needless cross-references

Because of the transition, some terms or clauses used in Division I are different from those used in other divisions and in other Contract parts. Interpret the equivalent term or clause shown in the following table as having the same meaning as the corresponding term or clause in Division I:

Terms Equivalencies

Term or clause in Division I	Equivalent term or phrase that may be in other divisions and in other Contract parts	Conditions
Authorize	Approve	Except in a Change Order
Authorized Material List	Pre-Qualified Products List	--
Agency	Engineer	Where referring to anyone other than the ~~County/District Resident~~ Engineer or the ~~County/District Resident~~ Engineer's authorized representatives
<work description> is change order work	<work description> will be paid for as extra work <with or without a reference to a section>	--

1-1.03–1-1.04 RESERVED**1-1.05 REFERENCES**

A reference within parentheses to a law or regulation is included in the Contract for convenience only and is not a comprehensive listing of related laws and regulations. Lack of a reference does not indicate no related laws or regulations exist.

Where the version of a referenced document is not specified, use the most recent version in effect on the date of the *Notice to Bidders*.

A reference to a section includes specifications in sections titled *General* that apply to the section.

Where a section number is referenced without a reference to a document, the reference is to a section of the *Standard Specifications* as revised by any revised standard specification, special provision, or both.
~~Any reference directly to a revised standard specification section is for convenience only. Lack of a direct reference to a revised standard specification section does not indicate a revised standard specification for the section does not exist.~~

A code not specified as a federal code is a California code.

An agency or a department not specified as a federal or local agency or department is a California agency or department.

1-1.06 ABBREVIATIONS

Unless context indicates otherwise, interpret the meaning of an abbreviation used in the specifications and the Bid Item List as shown in the following tables:

SECTION 1

GENERAL

<u>Abbreviation</u>	<u>Meaning</u>
<u>ACPWA</u>	<u>Alameda County Public Works Agency</u>
<u>ACFC&WCD</u>	<u>Alameda County Flood Control and Water Conservation District</u>
<u>Alameda CTC</u>	<u>Alameda County Transportation Commission</u>
<u>BOS</u>	<u>Alameda County Board of Supervisors</u>
<u>CVSD</u>	<u>Castro Valley Sanitary District</u>
<u>EBMUD</u>	<u>East Bay Municipal Utility District</u>
<u>MBE</u>	<u>Minority-owned Business Enterprise</u>
<u>MTC</u>	<u>Metropolitan Transportation Commission</u>
<u>M/WBE</u>	<u>Minority/Woman-owned Business Enterprise</u>
<u>OCC</u>	<u>Alameda County Auditor-Controller's Office of Contract Compliance</u>
<u>OLSD</u>	<u>Oro Loma Sanitary District</u>
<u>PG&E</u>	<u>Pacific Gas and Electric Company</u>
<u>UPRR</u>	<u>Union Pacific Railroad Company</u>
<u>USA</u>	<u>Underground Service Alert of Northern/Central California and Nevada</u>
<u>WBE</u>	<u>Woman-owned Business Enterprise</u>

Abbreviations

Abbreviation	Meaning
AASHTO	American Association of State Highway and Transportation Officials
AB	aggregate base
ACI	American Concrete Institute
ADL	aerially deposited lead
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AMA	archaeological monitoring area
ANSI	American National Standards Institute
APCD	Air pollution control district
API	American Petroleum Institute
AREMA	American Railway Engineering and Maintenance-of-Way Association
AQMD	Air quality management district
AS	aggregate subbase
ASME	American Society of Mechanical Engineers
ASQ	American Society for Quality
ATPB	asphalt treated permeable base
ATS	active treatment system
AWG	American Wire Gauge
AWPA	American Wood Protection Association
AWS ^a	American Welding Society
AWWA	American Water Works Association
AWIS	automated work zone information system
BBS	battery backup system
BNSF	Burlington Northern Santa Fe
Cal/OSHA	California Division of Occupational Safety and Health Administration
CBC	California Building Code
CDPH	California Department of Public Health
CIDH	cast-in-drilled-hole
CIH	Certified Industrial Hygienist
CIP	cast in place
CISS	cast-in-steel-shell
CJP	complete joint penetration
CMU	concrete masonry unit
CPM	critical path method
CPL	composite plastic lumber
CRCP	continuously reinforced concrete pavement
CRM	crumb rubber modifier
CSC	conductor signal cable
CSL	crosshole sonic logging
CSS	cement stabilized soil
CTB	cement treated base
CTPB	cement treated permeable base
CVN	Charpy V-notch
CWI	AWS Certified Welding Inspector
DBE	disadvantaged business enterprise
DRA	Dispute Resolution Advisor
DRB	Dispute Resolution Board
DTSC	Department of Toxic Substances Control
DVBE	disabled veteran business enterprise
ECTC	Erosion Control Technology Council
EIA/ECIA	Electronic Industries Alliance/Electronic Components Industry Association
ELAP	Environmental Laboratory Accreditation Program
ESA	environmentally sensitive area

SECTION 1

GENERAL

ETL	Electrical Testing Laboratories
f_c	extreme fiber compressive stress in concrete at service loads
f'_c	compressive strength of concrete
FHWA	Federal Highway Administration
FDR	full depth reclamation
GAAP	Generally Accepted Accounting Principles
GGBFS	ground granulated blast furnace slag; slag cement
GGL	gamma-gamma logging
GSP	galvanized steel pipe
HMA	hot mix asphalt
HMA-O	hot mix asphalt (open graded)
HS	high strength
ICC	International Code Council
ICEA	Insulated Cable Engineers Association
ITE	Institute of Transportation Engineers
IEEE	Institute of Electrical and Electronics Engineers
JMF	job mix formula
JPCP	jointed plain concrete pavement
ksf	kips per square foot
ksi	kips per square inch
LCB	lean concrete base
LCS	~~Department's~~ Caltrans lane closure system
LEED	Leadership in Energy and Environmental Design
LTDS	long term design strength
MC	medium curing
METS	~~Department's~~ Caltrans Materials Engineering and Testing Services
MPI	Master Painters Institute
MPQP	Material Plant Quality Program published by ~~Caltrans the Department~~
MR	movement rating
MSDS ^b	material safety data sheet
MT	magnetic particle testing
MUTCD	Manual on Uniform Traffic Control Devices
NAL	numeric action level
NDT	nondestructive testing
NEL	numeric effluent limitation
NETA	International Electrical Testing Association
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NMAS	nominal maximum aggregate size
NPDES	National Pollutant Discharge Elimination System
NPT	National Pipe Thread Taper
NRTL	Nationally Recognized Testing Laboratory
NTU	nephelometric turbidity unit
OBC	optimum binder content
OGFC	open graded friction course
OSD	Offices of Structure Design
PLAC	permit, license, agreement, certification, or any combination of these
PC	precast
PCC	portland cement concrete
pcf	pounds per cubic foot
PCMS	portable changeable message sign
PG	performance grade
PJP	partial joint penetration
POC	pedestrian overcrossing

SECTION 1

GENERAL

PQR	procedure qualification record
PS	prestressed
PSF	pedestrian signal face
PV	programmed visibility
QA	<u>Quality Assurance</u>
QC	<u>Quality Control</u>
QSD	qualified SWPPP developer
QSP	qualified SWPPP practitioner
RAP	reclaimed asphalt pavement
RCSC	Research Council on Structural Connections
RECP	rolled erosion control product
RFI	request for information
RHMA	rubberized hot mix asphalt
RHMA-G	rubberized hot mix asphalt (gap graded)
RHMA-O	rubberized hot mix asphalt (open graded)
RHMA-O-HB	rubberized hot mix asphalt (open graded high binder)
RPL	recycled plastic lumber
RSC	rapid strength concrete
RSP	rock slope protection
RSS	revised standard specifications
RT	radiographic testing
RWQCB	regional water quality control board
SMSA	Standard Metropolitan Statistical Area
SC	slow curing
SCC	self-consolidating concrete
SCM	supplementary cementitious material
SDS	safety data sheet
SSPC	The Society for Protective Coatings
SWPPP	stormwater pollution prevention plan
SWRCB	State Water Resources Control Board
TEES	Transportation Electrical Equipment Specifications
TIA	Telecommunications Industry Association; time impact analysis
TRO	time-related overhead
TV	target value
UFFA	ultra fine fly ash
UL	Underwriters Laboratories, Inc
USC	United States Code
USLE	Universal Soil Loss Equation
USM	unidentified stock material
UT	ultrasonic testing
VECP	value engineering change proposal
VFD	variable-frequency drive
VPM	volts per mil
WMA	warm mix asphalt
WPC	water pollution control
WPCP	water pollution control program
WPS	welding procedure specification
WQO	water quality objective

^aInterpret a reference to AWS as a reference to AWS, ANSI/AWS, or AASHTO/AWS

^bInterpret a reference to MSDS as a reference to SDS under 29 CFR 1910.1200

Bid Item List Abbreviations

Abbreviation	Meaning
~~ACRE~~ AC	acre
CF	cubic foot
CY	cubic yard
EA	each
(F)	final pay item
GAL	gallon
HR	hour
LB	pound
LF	linear foot
LS	lump sum
LNMI	lane mile
MFBM	thousand foot board measure
STA	station (100 feet)
~~SQFT~~ SF	square foot
~~SQYD~~ SY	square yard
TON	2,000 pounds
WDAY	working day

1-1.07 DEFINITIONS**1-1.07A General**

Interpret terms as defined in the Contract documents.

1-1.07B Glossary

abandon: Render unserviceable in place.

acts of God: *Acts of God* as defined in Pub Cont Code § 7105.

activity: Task, event, or other project element on a schedule that contributes to completing the project.
An activity has a description, start date, finish date, duration, and one or more logic ties.

adjust: Raise or lower a facility to match a new grade line.

aerially deposited lead: Lead primarily from vehicle emissions deposited within unpaved areas or formerly unpaved areas.

Agency: Alameda County Public Works Agency representing the County of Alameda or the Alameda County Flood Control and Water Conservatin District, whichever entity awards the Contract.

authorized laboratory: Independent testing laboratory (1) not employed or compensated by any subcontractor or subcontractor's affiliate providing other services for the Contract and (2) authorized by the Agency.

base: Layer of specified material of planned thickness placed immediately below the pavement or surfacing.

basement material: Material in an excavation or embankment under the lowest layer to be placed.

bid item: Work unit for which the Bidder provides a price.

Bid Item List: List of bid items, units of measure, and the associated quantities. The verified Bid Item List is the Bid Item List with verified prices. The Contract Proposal of Low Bidder ~~at the Department's website~~ is the verified Bid Item List. After contract award, interpret a reference to the Bid Item List as a reference to the verified Bid Item List.

Board:

1. Alameda County Board of Supervisors when the Project's plans and specifications are issued by the Alameda County Public Works Agency.
2. Alameda County Board of Supervisors acting in its capacity as the Alameda County Flood Control and Water Conservation District's Board of Directors when the Project's plans and specifications are issued by the District.

borrow: Fill acquired from an excavation source outside the described cut area.

1. **local borrow:** Material obtained by widening cuts or excavating from sources outside the planned or authorized cross section on the job site. The location of the local borrow is described or designated by the Engineer.
2. **imported borrow:** Borrow that is not local borrow.

bridge: Structure that:

1. Has a bridge number
2. Carries a (1) utility, (2) railroad, or (3) vehicle, pedestrian, or other traffic over, under, or around obstructions or waterways

building-construction contract: Contract that has *Building Construction* on the cover of the *Notice to Bidders and Special Provisions*.

California Test: ~~Caltrans Department~~ developed test for determining work quality. For California Tests, go to the METS website.

Caltrans: Department of Transportation as defined in St & Hwy Code 20 and authorized in St & Hwy Code 90, its authorized representatives.

certificate of compliance: Certificate stating the material complies with the Contract.

Certified Industrial Hygienist: Industrial hygienist certified in comprehensive practice by the American Board of Industrial Hygiene.

change order work: Work described in a Change Order, including extra work and work described in the Contract as change order work.

closure: Closure of a traffic lane or lanes, including shoulder, ramp, or connector lanes, within a single traffic control system.

commercial quality: Quality meeting the best general practices.

commercial source: Established business operating as a material source for the general public.

Contract: Written and executed contract between the County of Alameda or the Alameda County Flood Control and Water Conservation District and the Contractor.

Contract acceptance: Director's written acceptance of a completed Contract.

Contract time: Number of original working days as adjusted by any time adjustment.

Contractor: Person or business or its legal representative entering into a Contract with the Agency for performance of the work.

controlling activity: Construction activity that will extend the scheduled completion date if delayed.

County:

1. County of Alameda when the contract is authorized and executed by the Alameda County Board of Supervisors and the *Project Specifications* are issued by the Alameda County Public Works Agency; its authorized representatives; or

2. Alameda County Flood Control and Water Conservation District (District) when the contract is authorized and executed by the Alameda County Board of Supervisors acting in its capacity as the District's Board of Directors and the *Project Specifications* are issued by the District; its authorized representatives.

critical path: Longest continuous chain of activities for the project that has the least amount of total float of all chains. In general, a delay on the critical path extends the scheduled completion date.

critical path method: Network-based planning technique using activity durations and relationships between activities to calculate a schedule for the entire project.

culvert: Structure other than a bridge that provides an opening under a roadway.

data date: Day after the date through which a schedule is current. Everything occurring earlier than the data date is as-built and everything on or after the data date is planned.

day: 24 consecutive hours running from midnight to midnight; calendar day.

1. **business day:** Day on the calendar except a Saturday, **Sunday** and a holiday.
2. **working day:** Time measure unit for work progress. A working day is any 24-consecutive-hour period except:
 - 2.1. Saturday, **Sunday** and a holiday.
 - 2.2. Day during which you cannot perform work on the controlling activity for at least 50 percent of the scheduled work shift with at least 50 percent of the scheduled labor and equipment due to any of the following:
 - 2.2.1. Adverse weather-related conditions.
 - 2.2.2. Traffic maintenance under the Contract.
 - 2.2.3. Suspension of a controlling activity that you and the Engineer agree benefits both parties.
 - 2.2.4. Unanticipated event not caused by either party, such as:
 - 2.2.4.1. Act of God
 - 2.2.4.2. Act of a public enemy.
 - 2.2.4.3. Epidemic.
 - 2.2.4.4. Fire.
 - 2.2.4.5. Flood.
 - 2.2.4.6. Governor-declared state of emergency.
 - 2.2.4.7. Landslide.
 - 2.2.4.8. Quarantine restriction.
 - 2.2.5. Issue involving a third party, including:
 - 2.2.5.1. Industry or area-wide labor strike.
 - 2.2.5.2. Material shortage.
 - 2.2.5.3. Freight embargo.
 - 2.2.5.4. Jurisdictional requirement of a law enforcement agency.
 - 2.2.5.5. Workforce labor dispute of a utility or nonhighway facility owner resulting in a nonhighway facility rearrangement not described and not solely for the Contractor's convenience. Rearrangement of a nonhighway facility includes installation, relocation, alteration, or removal of the facility.
 - 2.3. Day during a concurrent delay.
3. **original working days:**
 - 3.1. Working days to complete the work shown on the *Notice to Bidders* for a non-cost-plus-time-based bid
 - 3.2. Working days bid to complete the work for a cost-plus-time-based bid

Where working days is specified without the modifier *original* in the context of the number of working days to complete the work, interpret the number as the number of original working days as adjusted by any time adjustment.

deduction: Money permanently taken from a progress payment or the final payment. Deductions are cumulative and are not retentions under Pub Cont Code § 7107.

delay: Event that extends the completion of an activity.

1. **excusable delay:** Delay caused by the Agency and not reasonably foreseeable when the work began, such as:
 - 1.1. Change in the work
 - 1.2. Agency action that is not part of the Contract
 - 1.3. Presence of an underground utility main not described in the Contract or in a location substantially different from that specified
 - 1.4. Described facility rearrangement not rearranged as described, by the utility owner by the date specified, unless the rearrangement is solely for the Contractor's convenience
 - 1.5. Agency's failure to obtain timely access to the right-of-way
 - 1.6. Agency's failure to review a submittal or provide notification in the time specified
2. **critical delay:** Excusable delay that extends the scheduled completion date
3. **concurrent delay:** Occurrence of at least 2 of the following events in the same period of time, either partially or entirely:
 - 3.1. Critical delay
 - 3.2. Delay to a controlling activity caused by you
 - 3.3. Non-working day

Department: ~~Department of Transportation as defined in St & Hwy Code § 20 and authorized in St & Hwy Code § 90; its authorized representatives.~~ When found in the Standard Specifications or other Caltrans documents, it is to be interpreted as Agency as defined above or as Caltrans if it is in reference to a Caltrans program, form or publication utilized by the Agency.

detour: Temporary route for traffic around a closed road part. A passageway through a job site is not a detour.

Director: ~~Department's~~ Director of Alameda County Public Works Agency or Alameda County Flood Control and Water Conservation District; Director's authorized representatives.

disabled veteran business enterprise: Business certified as a DVBE by the Department of General Services, Office of Small Business and DVBE Services.

disadvantaged business enterprise: Disadvantaged business enterprise as defined in 49 CFR 26.5.

dispose of: Remove from the job site.

District: Alameda County Flood Control and Water Conservation District

divided highway: Highway with separated traveled ways for traffic, generally in opposite directions.

Engineer: ~~Resident Engineer responsible for the Contract's administration; Resident Engineer's County Engineer or District Engineer or his~~ authorized representatives.

early completion time: Difference in time between an early scheduled completion date and the work completion date.

environmentally sensitive area: Area within or near construction limits where access is prohibited or limited to protect environmental resources.

estimated cost: Estimated cost of the project as shown on the *Notice to Bidders*.

extra work: Any work, desired or performed, but not included in the original Contract.

federal-aid contract: Contract that has a federal-aid project number on the cover of the *Notice to Bidders* and *Special Provisions*.

final pay item: Bid item whose quantity shown on the Bid Item List is the quantity paid.

SECTION 1

GENERAL

finished grade: Final surface of the completed facility. If the work under the Contract includes stage construction, the relation between the finished grade and the work under the Contract is shown.

fixed cost: Labor, material, or equipment cost directly incurred by the Contractor as a result of performing or supplying a particular bid item that remains constant regardless of the item's quantity.

float: Difference between the earliest and latest allowable start or finish times for an activity.

1. **Agency-owned float:** Time saved on the critical path by actions of the Agency. It is the last activity shown on the schedule before the scheduled completion date.

force account work: Work ordered on a construction project without an existing agreement on its cost, and performed with the understanding that the contractor will bill the owner according to the cost of labor, materials, and equipment, plus a certain percentage for overhead and profit.

grading plane: Basement material surface on which the lowest layer of subbase, base, pavement, surfacing, or other specified layer is placed.

highway: Whole right-of-way or area reserved for use in constructing the Project improvements roadway and its appurtenances.

holiday: Holiday shown in the following table:

Holidays	
Holiday	Date observed
~~Every Sunday~~	~~Every Sunday~~
New Year's Day	January 1st
Birthday of Martin Luther King, Jr.	3rd Monday in January
Lincoln's Birthday	February 12th
Washington's Birthday	3rd Monday in February
~~Cesar Chavez Day~~	~~March 31st~~
Memorial Day	Last Monday in May
Independence Day	July 4th
Labor Day	1st Monday in September
~~Columbus Day~~	~~2nd Monday in October~~
Veterans Day	November 11th
Thanksgiving Day	4th Thursday in November
Day after Thanksgiving Day	Day after Thanksgiving Day
Christmas Day	December 25th

If January 1st, February 12th, ~~March 31st~~, July 4th, November 11th, or December 25th falls on a Sunday, the Monday following is a holiday. If November 11th falls on a Saturday, the preceding Friday is a holiday.

hours of darkness: Hours of darkness as defined in Veh Code § 280.

idle equipment: Equipment:

1. On the job site at the start of a delay
2. Idled because of the delay
3. Not operated during the delay

informal-bid contract: Contract that has *Informal Bid* ~~Authorized by Pub Cont Code § 40122~~ on the cover of the Notice to Bidders, ~~Bid Book, and Revised Standard Specifications and Special Provisions~~. Informal bidding authority is under the Uniform Construction Cost Accounting Act. The Agency follows Pub Cont Code 22032 et seq and Alameda County Admin Code sections 4.24.010 et seq. These provisions allow for informal bidding for contracts \$125,000 or less (up to \$137,500 upon BOS resolution).

job site: Area within the defined boundaries of a project.

Labor Surcharge and Equipment Rental Rates: Caltrans publication that lists labor surcharge and equipment rental rates.

landscaping: Practice of a landscaping contractor under 16 CA Code of Regs § 832.27.

material: Any product or substance specified for use in the construction of a project.

material shortage:

1. Shortage of raw or produced material that is area-wide and caused by an unusual market condition except if any of the following occurs:
 - 1.1. Shortage relates to a produced, nonstandard material
 - 1.2. Supplier's and the Contractor's priority for filling an order differs
 - 1.3. Event outside the United States for a material produced outside the United States
2. Unavailability of water that delays a controlling activity

material source facility audit: Self-audit and a Department audit evaluating a facility's capability to consistently produce materials that comply with Department standards.

median: Portion of a divided highway separating the traveled ways including inside shoulders.

milestone: Event activity that has zero duration and is typically used to represent the start or end of a certain stage of the project.

mobilization: Preparatory work that must be performed or costs incurred before starting work on the various items on the job site (~~Pub Cent Code § 10104~~).

modify: Add to or subtract from an appurtenant part.

narrative report: Document submitted with each schedule that discusses topics related to project progress and scheduling.

near critical path: Chain of activities with total float exceeding that of the critical path but having not more than 10 working days of total float.

obliterate: Place an earth cover over or root, plow, pulverize, or scarify.

pavement: Uppermost layer of material placed on a traveled way or shoulder.

permanent erosion control establishment period: Number of working days shown on the *Notice to Bidders* for permanent erosion control establishment work.

plans: Standard plans, revised standard plans, and project plans.

1. **standard plans:** Drawings standard to Agency construction projects.
2. **revised standard plans:** New or revised standard plans.
3. **project plans:** Drawings specific to the project, including authorized shop drawings.

plant establishment period: Number of working days shown on the *Notice to Bidders* for plant establishment work.

quality characteristic: Characteristic of a material that is measured to determine conformance with a given requirement.

quality control plan: Contractor's plan to ensure QC.

reconstruct: Remove and disassemble and construct again at an existing or new location.

relocate: Remove and install or place in a new location.

remove: Remove and dispose of.

reset: Remove and install or place laterally at the same station location.

roadbed: Roadway portion extending from the curb line to curb line or the shoulder line to shoulder line.
A divided highway has 2 roadbeds.

roadside: Area between the outside shoulder edge and the right-of-way limits.

roadway: Portion of the right-of-way highway within the outside lines of improvements, including: curbs, sidewalks, slopes, ditches, channels, or waterways. A roadway includes the structures and features necessary for safety, protection of facilities, and drainage.

salvage: Remove, clean, and haul to a specified location.

schedule:

1. **baseline schedule:** Initial schedule showing the original work plan starting on the date of Contract approval. This schedule shows no completed work to date and no negative float or negative lag to any activity.
2. **revised schedule:** Schedule that incorporates a proposed or past change to logic or activity durations.
3. **updated schedule:** Current schedule developed from the accepted baseline and any subsequent accepted updated or revised schedules through regular monthly review to incorporate actual past progress.

scheduled completion date: Planned work completion date shown on the current schedule.

shoulder: Roadway portion contiguous with the traveled way for accommodation of a stopped vehicle, emergency use, and lateral support of base and surface courses.

small tool: Tool or piece of equipment not listed in Labor Surcharge and Equipment Rental Rates that has a replacement value of \$500 or less.

specifications: Standard specifications, revised standard specifications, and special provisions.

1. **standard specifications:** Specifications standard to State construction projects. These specifications are in a book titled *Standard Specifications*.
2. **revised standard specifications:** New or revised standard specifications for Agency construction projects. These specifications are in a section titled *Revised Standard Specifications with Special Provisions* of a book titled *Notice to Bidders, Bid Book, and Revised Standard Specifications with Special Provisions, and Information Handouts*.
3. **special provisions:** Specifications specific to the project. These specifications are in a section titled *Revised Standard Specifications with Special Provisions* of a book titled *Notice to Bidders, Bid Book, and Revised Standard Specifications with Special Provisions, and Information Handouts*.

State: State of California, including its agencies, departments or divisions whose conduct or action is related to the work.

Structure Design: Offices of Structure Design of the Department of Transportation.

subbase: Layer of material between a base and the basement material.

subgrade: Roadbed portion on which pavement, surfacing, base, subbase, or a layer of any other material is placed.

submittal:

1. **action submittal:** Written and graphic information and samples that require the Agency's response.
2. **informational submittal:** Written information that does not require the Agency's response.

substantial defects: Defects plainly seen as damaged, displaced, or missing parts or improper functioning of materials, parts, equipment, or systems.

substructure: Bridge parts below the bridge seats, pier tops, and haunches for rigid-framed bridges or spring lines for arched bridges; includes abutment backwalls, abutment parapets, and wingwalls.

superstructure: Bridge parts except the substructure.

supplemental project information: Information relevant to the project, specified as supplemental project information, and made available to bidders.

surfacing: Uppermost layer of material placed on a traveled way or shoulders; pavement.

time impact analysis: Analysis using a CPM schedule developed specifically to demonstrate the effect a proposed or past change or delay has on the current scheduled completion date.

time-scaled network diagram: Graphic depiction of a CPM schedule comprised of activity bars with relationships for each activity represented by arrows. The tail of each arrow connects to the activity bar for the predecessor and points to the successor.

total bid: Sum of the item totals as verified by the Agency; original Contract price.

total float: Amount of time that an activity or chain of activities can be delayed before extending the scheduled completion date.

traffic: Pedestrians, bicyclists, ridden or herded animals, vehicles, streetcars, and other conveyances either singularly or together while using any highway for purposes of travel.

traffic break: Traffic operation performed by a California Highway Patrol officer or other law enforcement officer to slow or stop traffic within the traveled way.

traffic lane: Portion of traveled way used for the movement of a single line of vehicles.

traveled way: Portion of the roadway for the movement of vehicles, exclusive of the shoulders, berms, sidewalks, and parking lanes.

tunnel: Tunnel as defined in 8 CA Code of Regs § 8405 et seq.

unauthorized work: Work performed beyond the lines and grades described in the Contract or established by the Engineer or extra work performed without Agency authorization.

unsuitable material: Material encountered below the natural ground surface in embankment areas or below the grading plane in excavation areas that the Engineer determines to be in any of the following conditions:

1. Of such unstable nature that it cannot be compacted to the specified density using ordinary methods at optimum moisture content.
2. Too wet to be properly compacted and cannot be dried before incorporating it into the work. Excessive moisture alone is not sufficient cause for determining that the material is unsuitable.
3. Inappropriate for the planned use.

withhold: Money temporarily or permanently taken from a progress payment.

work: Resources and activities required for Contract acceptance, including labor, materials, equipment, and the created product.

work plan: Detailed formulation of a program of action.

work zone: Area of a highway with construction, maintenance, or utility work activities.

1-1.08 DISTRICTS

The Caltrans district composition and office addresses are as shown in the following table:

(Table has been deleted to conserve space.)

If the Project requires coordination with Caltrans, the Caltrans district office for Alameda County is District 4 located at 111 Grand Ave, Oakland. Its mailing address is PO Box 23660, Oakland, CA 94623-0660.

~~A project with work in District 1, 2, or 3 is a North Region project. For Districts 1, 2, and 3, interpret each reference to the district office as the North Region office. The North Region's office address is the District 3 address.~~

1-1.09 FREEZE-THAW AREAS

Freeze-thaw areas are areas of the State where freeze-thaw cycles and heavy salting frequently occur. A project is in a freeze-thaw area if the project is specified in the special provisions to be in a freeze-thaw area.

1-1.10 PAVEMENT CLIMATE REGIONS

To help account for the effects of various climatic conditions on pavement performance, the County has been divided into ~~9~~ 2 climate regions. The project's pavement climate region is shown on the project plans.

1-1.11 WEBSITES, ADDRESSES, AND TELEPHONE NUMBERS

(Original Caltrans table has been replaced by the following Agency table.)

Websites, Addresses, and Telephone Numbers

Reference or agency or department unit	Website	Address	Telephone no.
Agency	www.acpwa.org	399 ELMHURST ST HAYWARD CA 94544	510-670-5480
CA Unified Certification Program's list of certified DBEs	http://www.dot.ca.gov/hq/bep/find_certified.htm	--	--
California MUTCD	http://www.dot.ca.gov	--	--
Caltrans	http://www.dot.ca.gov	--	--
Caltrans Authorized Facility Audit List	http://www.dot.ca.gov/hq/esc/Translab/OSM/documents/smdocuments/Internet_auditlisting.pdf	--	--
Caltrans Authorized Material List	http://www.dot.ca.gov/hq/esc/approved_products_list/	--	--
Caltrans Authorized Material Source List	http://www.dot.ca.gov/hq/esc/Translab/authorized_material_source_list/	--	--
Caltrans Authorized Material Systems List	http://www.dot.ca.gov/hq/esc/Translab/authorized_systems_list/	--	--
Caltrans Authorized Laboratory List	http://www.dot.ca.gov/hq/esc/Translab/authorized_laboratories_list/	--	--
Caltrans METS	http://www.dot.ca.gov/hq/esc/Translab/	--	--
Department of Conservation, Office of Mine Reclamation	http://www.conservation.ca.gov/dmr/	--	--
Department of Industrial Relations	http://www.dir.ca.gov	455 GOLDEN GATE AVE SAN FRANCISCO CA 94102	--
MPQP	http://www.dot.ca.gov/manuals.htm	--	--

1-1.12 MISCELLANY

Make checks and bonds payable to the entity that awards the Contract—County of Alameda or Alameda County Flood Control and Water Conservation District ~~Department of Transportation~~.

1-1.13–1-1.15 RESERVED

2 BIDDING

2-1.01 GENERAL

Section 2 includes specifications related to bid eligibility and the bidding process.

2-1.02 BID INELIGIBILITY

A firm that has provided architectural or engineering services to the Agency for this contract before bid submittal for this contract is prohibited from any of the following:

1. Submitting a bid
2. Subcontracting for a part of the work
3. Supplying materials

A firm that cannot certify compliance with the provisions of the Iran Contracting Act of 2010 (Pub Cont Code §§ 2200-2208) is prohibited from submitting a bid of \$1,000,000 or more.

2-1.03 CONTRACTOR REGISTRATION

Section 2-1.03 applies when the Contract amount is \$25,000 or more.

No contractor or subcontractor may be listed on a bid proposal for a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5 [with limited exceptions from this requirement for bid purposes only under Labor Code section 1771.1(a)].

2-1.04 PREBID OUTREACH MEETING

Section 2-1.04 applies if a mandatory prebid meeting is shown on the *Notice to Bidders*.

The Agency will conduct at least one a meeting to provide small businesses, including M/WBEs, DVBES and DBEs, the opportunity to meet and interact with prospective bidders in an effort to increase their participation in the performance of contracts.

Each bidder must attend at least one the meeting. ~~The bidder's representative must be a company officer, project superintendent, or project estimator.~~ For a joint venture, one of the parties must attend the mandatory prebid meeting.

The Agency does not accept a bid from a bidder who did not attend the meeting.

A sign-in sheet will be used to identify the attendees. Each bidder must include the name and title of the company representative attending the meeting.

The Agency may hold a single prebid meeting for more than one contract. Sign the sign-in sheet for the contract you intend to bid on. If you are bidding on multiple contracts, sign each sign-in sheet for each contract you intend to bid on. The sign-in sheets, with the names of all companies in attendance at each prebid meeting, will be made available following the meeting at the website shown on the Notice to Bidders for bidder inquiries.

If multiple meetings are held, a bidder need only attend one.

The successful bidder is required to report each small business hired to work on this Contract as a result of the meeting.

2-1.05 RESERVED

2-1.06 BID DOCUMENTS

2-1.06A General

The Bid Book portion of the Notice to Bidders, Bid Book, Revised Standard Specifications with Special Provisions and Information Handouts includes bid forms and certifications ~~including forms not submitted through the electronic bidding service.~~

The Notice to Bidders, Bid Book, and Revised Standard Specifications with Special Provisions, and Information Handouts includes the Notice to Bidders, Bid Book, revised standard specifications, ~~and~~ special provisions and informational handouts.

~~The Bid book, including Bid book forms not available through the electronic bidding service, The Notice to Bidders, Bid Book, and Revised Standard Specifications with Special Provisions, and Information Handouts, project plans, and any addenda to these documents may be accessed at: www.acpwa.org/current-contracting-opportunities#construction. the Department's Office of Construction Contract Awards website.~~

The *Standard Specifications* and *Standard Plans* may be viewed at the [Caltrans Office of Construction Contract Awards website](#) and may be purchased at the [Caltrans Publication Distribution Unit](#).

2-1.06B Supplemental Project Information

The Agency makes supplemental information available as [Information Handouts or as](#) specified in the special provisions.

Logs of test borings are supplemental project information.

~~If an Information Handout or electronic design files are available, you may view them at the Contract Plans and Special Provisions link at the Department's Office of Construction Contract Awards website. Electronic design files contain design information such as cross sections, digital models, and roadway design alignments and profiles.~~

~~If rock cores are available, you may view them by sending a request to Coreroom@dot.ca.gov.~~

If other supplemental project information is available for inspection, you may view it by ~~phoning in~~ [emailing](#) a request [to the addresses listed under the Special Notices](#).

Make your request at least 7 days before viewing. Include in your request:

1. ~~District County Route Project Title~~
2. ~~Contract number Project Specification number~~
3. Viewing date
4. Contact information, including telephone number

~~For rock cores, also include the bridge number in your request.~~

~~If bridge as built drawings are available:~~

1. ~~For a project in District 1 through 6 or 10, you may request them from the Office of Structure Maintenance and Investigations, fax (916) 227-8357~~
2. ~~For a project in District 7, 8, 9, 11, or 12, you may request them from the Office of Structure Maintenance and Investigations, fax (916) 227-8357, and they are available at the Office of Structure Maintenance and Investigations, Los Angeles, CA, telephone (213) 897-0877~~

As-built drawings may not show existing dimensions and conditions. Where new construction dimensions are dependent on existing [bridge structure](#) dimensions, verify the field dimensions and adjust the dimensions of the work to fit the existing conditions.

2-1.06C–2-1.06D Reserved

2-1.07 JOB SITE AND DOCUMENT EXAMINATION

Examine the job site and bid documents. Notify the Agency of apparent errors and patent ambiguities in the plans, specifications, and Bid Item List. Failure to do so may result in rejection of a bid or rescission of an award.

[Submit notifications and bid related questions to both email addresses provided under Special Notices.](#)

[Following the receipt of any notifications or questions, an addendum addressing the issues raised may be published prior to the bid due date.](#)

Bid submission is your acknowledgment that you have examined the job site and bid documents and are satisfied with:

1. General and local conditions to be encountered
2. Character, quality, and scope of work to be performed
3. Quantities of materials to be furnished
4. Character, quality, and quantity of surface and subsurface materials or obstacles
5. Requirements of the contract

2-1.08 RESERVED**2-1.09 BID ITEM LIST****2-1.09A General**

Submit a bid based on the bid item quantities shown on the Bid Item List.

When provided, the quantities shown on the Bid Item List are approximate and given for the purpose of comparing bids only. A quantity designated as a final quantity on the Bid Item List shall be the quantity for which payment will be made unless the work as shown is revised by the Engineer. The Agency does not expressly or by implication agree or guarantee that the actual amount of work will correspond to the preliminary estimate or to the quantities set forth, but reserves the right, insofar as authorized by law, to increase or decrease the amount of any class or portion of the work, or to omit portions of the work as may be deemed necessary or expedient by the Engineer.

2-1.09B Contingent Items of Work

A Bid Item shown as “contingent” on the Bid Item List shows a nominal quantity that represents no actual estimate. The quantity may be greatly increased or decreased or reduced to zero.

The increase or reduction of quantity as compared with that set forth on the Bid Proposal will not constitute a basis for claim for extra payment or damages. Payment for the actual work performed based upon the prices bid or work done for the items of work involved will be considered full compensation to the Contractor for the work.

2-1.09C Additive/Deductive Bid Items

A Bid Item designated as “additive” on the Bid Item List may be added to the Contract’s scope of work.

A Bid Item designated as “deductive” on the Bid Item List may be deducted from the Contract’s scope of work.

Failure to furnish a price for all additive and deductive items will result in the Bid being rejected as non-responsive. An additive or deductive bid of \$1.00 will be considered responsive.

The lowest bid by a responsible bidder will be the lowest total of the bid prices on the base contract plus all additive items and minus all deductive items. This lowest responsible bid will be the basis of award under Public Contract Code §20103.8.

After the lowest responsible bidder has been determined, the Agency will decide which, if any, additive items will be added to the Contract and which, if any, deductive items will be deducted from the Contract.

In evaluating bid alternatives, the Agency reserves broad discretion. Neither the judgment applied during the evaluation of alternatives nor the final decision reached is subject to appeal.

2-1.10 SUBCONTRACTOR LIST

On the Subcontractor List form, list each subcontractor that will perform work in an amount in excess of 1/2 of 1 percent of the total bid or \$10,000, whichever is greater (Pub Cont Code § 4100 et seq.).

For each subcontractor listed, the Subcontractor List form must show:

1. Business name and the location of its place of business.
2. California contractor license number for a non-federal-aid contract.
3. Public works contractor registration number.
4. Portion of work it will perform. Show the portion of the work by:

Villareal & Greenville

- 4.1. Bid item numbers for the subcontracted work
- 4.2. Percentage of the subcontracted work for each bid item listed
- 4.3. Description of the subcontracted work if the percentage of the bid item listed is less than 100 percent

2-1.11 RESERVED**2-1.12 DISADVANTAGED BUSINESS ENTERPRISES**Not Used**2-1.13 MINORITY/WOMAN-OWNED BUSINESS GOALS****2-1.13A General**

Section 2-1.13 applies to a locally funded project when your bid is \$100,000 or more or when Minority/Woman-Owned Business Goals are specified in the Notice to Bidders.

The cover of the Project Specifications identifies the project as locally funded, a federal-aid project, or an Alameda CTC funded project. Section 2-1.13 does not apply to a federal-aid project or an Alameda CTC funded project.

To be considered responsive, your bid must demonstrate a commitment to achieve the Minority/Woman-Owned Business Enterprise (M/WBE) goals specified in the Notice to Bidders or provide evidence of a good faith effort.

2-1.13B Definitions

Minority/Woman-Owned Business Enterprise: a socially and economically disadvantaged business concern.

Socially and economically disadvantaged business concern: a business that meets all of the following criteria:

1. A business that is at least 51 percent owned by one or more socially or economically disadvantaged persons, M/WBE persons, or in the case of any business whose stock is publicly held, at least 51 percent of the stock is owned by one or more of those persons.
2. A business that is a small business concern as defined by the U.S. Small Business Act, that is, controlled by the same socially and economically disadvantaged individuals which have average annual gross receipts over the preceding 3 fiscal years not to exceed \$21,300,000.
3. A business whose management and daily business operations are controlled by one or more socially and economically disadvantaged persons.

Socially and economically disadvantaged persons: women, African-Americans, Hispanic-Americans, Native-Americans (including American-Indians, Eskimos, Aleuts, and Native Hawaiians), Asian-Pacific-Americans (including persons whose origins are from Japan, China, the Phillipines, Vietnam, Korea, Samoa, Guam, the United States Trust Territories of the Pacific, Northern Marianas, Laos, Cambodia, and Taiwan), and other minorities or any other group of natural persons determined by the State Department of Transportation to be so disadvantaged.

2-1.13C M/WBE Requirements

M/WBE goals can only be achieved through the use of M/WBE subcontractors, suppliers and/or truckers. A certified M/WBE firm will be deemed only as an MBE or a WBE—not both.

Consideration toward achieving the goals are given to firms whose M/WBE status is any of the following:

1. Recognized by Caltrans
2. Certified by Caltrans
3. Certified by others whose certification Caltrans deems acceptable
4. Certified by any of the following organizations:
 - a. Bay Area Rapid Transit

Villareal & Greenville

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- b. City of Oakland
- c. City of Richmond
- d. City of San Jose
- e. Contra Costa County Transit Authority
- f. Port of Oakland
- g. San Francisco Human Rights Commission
- h. Santa Clara Transit Authority
- i. U.S. Small Business Administration
- j. U.S. DOT – Unified Certification Program (UCP)

Validation of certification must be provided with the M/WBE information sheet.

A bidder certified as an M/WBE firm, cannot count the value of work it intends to perform with its own forces toward the specified goals. M/WBE bidders planning to perform all the work with its own forces must attempt to achieve the goals solely through the use of suppliers and/or truckers.

Suppliers that are not manufacturers will count as 60% of their value furnished toward the M/WBE requirement. Suppliers that are manufacturers (ie. creates or substantially modifies a product, such as concrete) will count as 100 percent of their value toward the M/WBE requirement.

2-1.13D Bid Evaluation Procedures

2-1.13D(1) Good Faith Effort

You are required to make a substantial good faith effort to secure the participation of certified M/WBE subcontractors, suppliers and/or truckers on the project. Unless rebutted, achievement of the goals specified in the Notice to Bidders constitutes substantial good faith effort.

Failure to make a substantial good faith effort toward achieving the specified participation of M/WBE subcontractors, suppliers, and/or truckers will be grounds for bid rejection.

If you fail to achieve the M/WBE participation goals, you will be judged to have made a substantial good faith effort if you:

1. Attended the pre-bid meeting specified in the Notice to Bidders;
2. Identified and selected specific items of the project to be performed by M/WBEs;
3. Advertised, not less than 10 calendar days before bid opening, in one or more daily or weekly newspapers, trade association publications, minority or trade oriented publications, trade journals, or other media, specified by the Agency for M/WBEs that are interested in participating in the project. This paragraph applies only if the project was publically advertised by the Agency 15 calendar days or more prior to bid opening;
4. Provided written notice of your interest in bidding on the contract to M/WBEs 10 calendar days prior to bid opening. To the extent possible, the Agency, through other sources, will make available to you, not less than 15 calendar days prior to the bid opening, a list or a source of lists of enterprises which are certified by Caltrans or other agencies as M/WBEs. If the Agency does not provide you that list, you may utilize the list of certified M/WBEs prepared by Caltrans. Unless stated otherwise in an amendment to this provision, the number of M/WBE firms required to be notified is three for each item of the project selected to be performed by an M/WBE, when an M/WBE subcontractor has not been secured for that item;
5. Followed up initial solicitations of interest by contacting the enterprises to determine with certainty whether the enterprises were interested in performing specific items of the project;
6. Provided interested M/WBEs with information about the plans, specifications, and requirements for the selected subcontracting or material supply work;
7. Requested assistance from community organizations; M/WBE contractor groups; veterans groups; local, State, or Federal disadvantaged business assistance offices; or other organizations that provide assistance in the recruitment and placement of M/WBEs, as they are available;
8. Negotiated in good faith with the M/WBEs, and did not unjustifiably reject their bids;
9. Advised and made efforts as applicable to assist interested M/WBEs in obtaining bonds, lines of credit, or insurance that either you or the Agency require;

10. Made efforts to obtain M/WBE participation that could reasonably be expected to produce a level of participation sufficient to meet requirements.
Performing all of the above creates a rebuttable presumption, where your substantial good faith effort is deemed true unless it is contested and proven otherwise. Maintain records of your effort.

2-1.13D(2) M/WBE Solicitation Assistance

Local firms that may be able to assist with M/WBE solicitations are listed below for your convenience. The Agency does not endorse or require you to engage the services of any of these firms.

1. DBE Goodfaith, Inc., Newark (877) 802-3394 <https://www.dbegoodfaith.com>
2. L. Luster & Associates, Oakland (510) 282-7769 <https://llusterassociates.com>
3. VSCE, Inc., Oakland (510) 835-5001 <http://vsceinc.com>

2-1.13D(3) Good Faith Effort Checklist and M/WBE Bid Information Form

You must submit the Good Faith Effort Checklist (CCP Form 100) and the M/WBE Bid Information Form (CCP Form 101 and 101A) as part of your Bid Proposal. The information supplied must be certified by a principal of the firm.

Supporting documents of good faith efforts of the three apparent low bidders must be submitted as specified in the Notice to Bidders. The dollar values entered on form 101 will be solely for the use of Agency staff.

2-1.13D(4) M/WBE Subcontractors, Suppliers, and/or Trucking Bid Amounts

Following bid opening, the M/WBE subcontractors, suppliers and/or trucking firms who bid to the two apparent low bidders may be required to provide the amounts of their bids to the Agency for the purposes of verification. The information, if required, must be certified by a principal of the firm. It will be treated as proprietary, and will be solely for the use of Agency staff.

2-1.13D(5) Explanation of Efforts Toward Unmet Goals

When either of the two apparent low bidders has not achieved the specified goals, such apparent low bidder will be required to explain in writing exactly what good faith efforts were undertaken to solicit, secure, consider and use bids from M/WBE firms. This must be accomplished within the time frame designated by the Agency and prior to Contract award. The apparent low bidders may also be required to attend a conference to discuss the written explanations.

If you are the apparent low bidder and have not achieved the M/WBE requirement, but you have listed a non-M/WBE firm for a portion of the job for which the bid of an M/WBE has been rejected, you may be required to submit a written explanation as to the reason the bid of the M/WBE firm was rejected. The explanation should include the dates, times, and amounts of alternative bids from the firm to whom the job was awarded and from the firm which was rejected. If the reason for rejection is based solely upon bondability, there must be an additional detailed explanation of the effort undertaken to assist the subcontractor in obtaining a bond including, but not limited to, introduction and/or recommendation to your bonding organization.

Acceptance or rejection of your explanation will be made by the Agency Director or a designated representative.

2-1.13D(6) Rejection of Bid

If your justification is rejected, and the Agency Director recommends rejection of your Bid, you shall have the right to contest the decision before the Board of Supervisors. If a recommendation of Bid rejection by the Agency Director is upheld by the BOS, the contract may be awarded to the next lowest responsible bidder.

2-1.13E Joint Ventures

Whenever a joint venture occurs involving an M/WBE firm at any level of contracting, trucking, or supplying, you must provide the Agency with a full account of the nature of ownership interests, the basis for creation of the joint venture, and the particular financial participation and administrative responsibilities of the interested parties. In evaluating your effort, the M/WBE

percentage which is to be attributed to a joint venture shall be determined by multiplying the percentage of the total contract amount which is to be performed by the joint venture times the percentage of actual financial participation in the joint venture which the M/WBE business represents.

2-1.14 ALAMEDA CTC

Not Used

2-1.15 DISABLED VETERAN BUSINESS ENTERPRISES

Not Used

2-1.16–2-1.17 RESERVED

2-1.18 SMALL BUSINESS AND NON–SMALL BUSINESS SUBCONTRACTOR PREFERENCES

Not Used

2-1.19–2-1.26 RESERVED

2-1.27 CALIFORNIA COMPANIES

Not Used

2-1.28–2-1.30 RESERVED

2-1.31 OPT OUT OF PAYMENT ADJUSTMENTS FOR PRICE INDEX FLUCTUATIONS

Not Used

2-1.32 RESERVED

2-1.33 BID DOCUMENT COMPLETION AND SUBMITTAL

2-1.33A General

Complete the forms in the *Bid* book.

Use the forms provided by the Agency ~~except as otherwise specified for a bidder's bond.~~

~~Do not fax forms except for the copies of forms with the public works contractor registration number submitted after the time of bid. Fax those copies to (916) 227-6282.~~

Failure to submit the forms and information as specified may result in a nonresponsive bid.

If an agent other than the authorized corporate officer or a partnership member signs the bid, file a Power of Attorney with the Agency either before opening bids or with the bid. Otherwise, the bid may be nonresponsive.

Complete and submit the *Bid* book as described in the Instruction to Bidders included with the forms. Do so by the deadline stipulated in the Notice to Bidders under the Electronic Bidding Guide at the Department's Office of Construction Contract Awards.

~~Your authorized digital signature is your confirmation of and agreement to all certifications and statements contained in the *Bid* book.~~

~~On forms and certifications that you submit through the electronic bidding service, you agree that each form and certification where a signature is required is deemed as having your signature.~~

2-1.33B Bid Form Submittal Schedules

2-1.33B(1) General

The *Bid* book includes forms specific to the Contract. ~~The deadlines for the submittal of the forms vary depending on the requirements of each Contract. Determine the requirements of the Contract and submit the forms based on the applicable schedule specified in section 2-1.33B.~~

Bid forms and information on the form that are due after the time of bid may be submitted at the time of bid.

2-1.33B(2) Federal-Aid Contracts

Not Used

2-1.33B(3) Non-Federal-Aid Contracts

Not Used

2-1.33B(4)–2-1.33B(9) Reserved**2-1.34 BIDDER'S SECURITY**

Submit one of the following forms of bidder's security equal to at least 10 percent of the bid:

1. Cash
2. Cashier's check
3. Certified check
4. ~~Signed A~~ bidder's bond ~~executed~~ by an admitted surety insurer
5. ~~Electronic bidder's bond by an admitted surety insurer submitted using an electronic registry service approved by the Agency.~~

Submit cash, cashier's check, certified check, or bidder's bond to the Agency before the bid opening time.

~~Submit an electronic bidder's bond with the electronic bid.~~

If using a bidder's bond, you ~~must may~~ use the form in the *Bid* book. ~~If you do not use the form in the Bid book, use a form containing the same information.~~

2-1.35–2-1.39 RESERVED**2-1.40 BID WITHDRAWAL**

Bids are not filed with the Agency until the date and time of bid opening.

A bidder may withdraw ~~or revise~~ a bid after it has been submitted by submitting a written bid withdrawal request at the location where the bid was submitted. Withdrawing a bid does not prevent you from submitting a new bid. ~~to the electronic bidding service if this is done before the bid opening date and time.~~

After the bid opening time, you cannot withdraw a bid.

2-1.41–2-1.42 RESERVED**2-1.43 BID OPENING**

The Agency publicly opens and reads bids at the time and place shown on the *Notice to Bidders*.

2-1.44–2-1.45 RESERVED**2-1.46 AGENCY'S DECISION ON A BID**

The Agency's decision on the bid amount is final.

The Agency may reject:

1. All bids
2. A nonresponsive bid
3. A bid from any entity that is a parent, affiliate, or subsidiary, or that is under common ownership, control, or management with any other entity submitting a bid on the project

2-1.47 BID RELIEF

The Agency may grant bid relief under Pub Cont Code § 5100 et seq. Submit any request for bid relief to the ~~Office~~ Engineer. ~~The Relief of Bid Request form is available at the Agency's website.~~

2-1.48 RESERVED**2-1.49 SUBMITTAL FAILURE HISTORY**

The Agency considers a bidder's past failure to submit documents required after bid opening in determining a bidder's responsibility.

2-1.50 BID RIGGING

Section 2-1.50 applies to a federal-aid contract.

The US Department of Transportation (DOT) provides a toll-free hotline to report bid rigging activities. Use the hotline to report bid rigging, bidder collusion, and other fraudulent activities. The hotline number is (800) 424-9071. The service is available 24 hours 7 days a week and is confidential and anonymous. The hotline is part of the DOT's effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the DOT Inspector General.

3 CONTRACT AWARD AND EXECUTION

3-1.01 GENERAL

Section 3 includes specifications related to contract award and execution.

3-1.02 CONSIDERATION OF BIDS

3-1.02A General

For a lump-sum-based bid, the Agency compares bids based on the total price.

For a unit-price-based bid, the Agency compares bids based on the sum of the item totals.

For a cost-plus-time-based bid, the Agency compares bids based on the sum of the item totals and the total bid for time.

3-1.02B Tied Bids

The Agency breaks a tied bid with a coin toss. ~~except:~~

- ~~1. If a small business bidder and a non-small business bidder request preferences and the reductions result in a tied bid, the Department awards the contract to the small business bidder.~~
- ~~2. If a DVBE small business bidder and a non-DVBE small business bidder request preferences and the reduction results in a tied bid, the Department awards the contract to the DVBE small business bidder.~~

3-1.03 CONTRACTOR REGISTRATION

Section 3-1.03 applies when the Contract amount is over \$25,000.

No contractor or subcontractor may be awarded a contract for public work on a public works project (awarded on or after April 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code section 1725.5.

3-1.04 CONTRACT AWARD

~~Submit any bid protest to the Office Engineer.~~

~~If the Agency awards the contract, the award is made to the lowest responsible bidder within the number of days shown in the following table:~~

~~Contract Award Period~~	
~~Days after bid opening~~	~~Project estimated cost shown on the Notice to Bidders~~
~~30~~	~~≤ \$200 million~~
~~60~~	~~≥ \$200 million~~

~~The Agency may extend the specified award period if the Bidder agrees.~~

~~You may request to extend the award period by faxing a request to (916) 227-6282 before 4:00 p.m. on the last day of the award period. If you do not make this request, after the specified award period:~~

- ~~1. Your bid becomes invalid~~
- ~~2. You are not eligible for the award of the contract~~

3-1.04A General

If the Agency awards the contract, the award is made to the lowest responsible and responsive bidder.

The Agency's determination of lowest responsible bidder/lowest responsive bid can be protested and appealed. The procedures and time limits set forth in this section are mandatory and are the sole and exclusive remedy in the event of bid protest. Failure to timely complete the bid protest and appeal procedures will be deemed a failure to exhaust administrative remedies.

SECTION 3

CONTRACT AWARD AND EXECUTION

Failure to exhaust administrative remedies, or failure to comply otherwise with the procedures of section 3-1.04 will constitute a waiver of any right to further pursue the bid protest, including filing a Government Code Claim or legal proceedings.

3-1.04B Bid Protest Procedures

Any bid protest must be submitted in writing to the Agency's Deputy Director of Construction and Development by 5:00 pm on the 5th business day following the Bid Opening. Submit a protest to:

Deputy Director of Construction and Development
Alameda County Public Works Agency
951 Turner Court, Hayward, CA 94545
Fax: (510) 670-5269

A protest must:

1. Contain a complete statement of any and all basis for the protest
2. Refer to the specific portions of any and all documents that form the basis for the protest
3. Include the name, address, and telephone number of the person representing the protesting party

Upon receipt of a protest, the Deputy Director, at his/her discretion, may:

1. Investigate the protest
2. Obtain additional information
3. Provide an opportunity to settle the protest by mutual agreement
4. Schedule a meeting with the protesting bidder and others (as appropriate) to discuss the protest

The Deputy Director's decision on the bid protest will:

1. Be issued at least ten business days prior to contract award
2. Be communicated by e-mail, fax, or USPS mail
3. Be provided to all bidders affected by the decision
4. Inform as to whether or not the Agency's recommendation to the Board is going to change

3-1.04C Appeal of Agency's Decision

The decision of the Deputy Director may be appealed in writing to the Auditor-Controller's Office of Contract Compliance (OCC) by 5:00 pm on the 5th business day following the issuance of the decision, not the date it is received. Submit an appeal to:

Office of Contract Compliance
Alameda County Auditor-Controller's Office
1221 Oak Street, Rm 249, Oakland, CA 94612
Fax: (510) 272-6502

The appeal must specify the decision being appealed and all the facts and circumstances relied upon in support of the appeal.

The appeal will be limited to:

1. The grounds raised in the original protest and the decision by the Agency's Deputy Director
2. The review of the bid process to determine if the Agency materially erred in following provisions, contracting policies, or other regulations and laws

The decision of the OCC is the final step of the appeal process.

SECTION 3

CONTRACT AWARD AND EXECUTION

3-1.05 CONTRACT BONDS (PUB CONT CODE ~~§20129(b): CA CIVIL CODE §9554) §§ 10221 AND 10222~~)

The successful bidder must furnish 2 bonds:

1. Payment bond to secure the claim payments of laborers, workers, mechanics, or materialmen providing goods, labor, or services under the Contract. This bond must be equal to at least 100 percent of the total bid.
2. Performance bond to guarantee the faithful performance of the Contract. This bond must be equal to ~~at least 50~~ 100 percent of the total bid.

The Agency provides bond forms to the successful bidder. Samples are provided under section 3-1.18, "Contract Execution."

Submit the bonds as part of the executed contract documents. The bonds must be:

1. Surety bonds
2. Executed by corporations licensed by the State of California
3. Issued at your expense
4. Maintained by you and at your expense for the duration of the Contract

3-1.06 CONTRACTOR LICENSE

For a federal-aid contract, the Contractor must be properly licensed as a contractor from contract award through Contract acceptance (Pub Cont Code § 10164).

For a non-federal-aid contract:

1. Contractor must be properly licensed as a contractor from bid opening through Contract acceptance (Bus & Prof Code § 7028.15)
2. Joint venture bidders must obtain a joint venture license before contract award (Bus & Prof Code § 7029.1)

3-1.07 INSURANCE POLICIES

Comply with section 7-1.06, "Insurance."

The successful bidder must submit:

1. Copy of its commercial general liability policy and its excess policy or binder until such time as a policy is available, including the declarations page, applicable endorsements, riders, and other modifications in effect at the time of contract execution. Standard ISO form no. CG 00 01 or similar exclusions are allowed if not inconsistent with section 7-1.06. The allowance of additional exclusions is at the discretion of the Agency.
2. Certificate of insurance showing all other required coverages. Certificates of insurance, as evidence of required insurance for the auto liability and any other required policy, must set forth deductible amounts applicable to each policy and all exclusions that are added by endorsement to each policy. The evidence of insurance must provide that no cancellation, lapse, or reduction of coverage will occur without 10 days prior written notice to the Agency.
3. Declaration under the penalty of perjury by a CPA certifying the accountant has applied GAAP guidelines confirming the successful bidder has enough funds and resources to cover any self-insured retentions if the self-insured retention is over \$50,000.

If the successful bidder uses any form of self-insurance for workers compensation in lieu of an insurance policy, the Bidder must submit a certificate of consent to self-insure under Labor Code § 3700.

3-1.08 SMALL BUSINESS PARTICIPATION REPORT

Not Used

3-1.09 PROJECT STABILIZATION/COMMUNITY BENEFITS

Section 3-1.09 applies to non-Federally funded contracts of any contract amount.

You and your subcontractors are required to become a party to and comply with the Project Stabilization/Community Benefits Agreement for the County of Alameda (posted at <https://www.acpwa.org/codes-and-ordinances/>).

This agreement, as it relates to Agency projects (per the MOU side letter), requires that any trucking work to be subcontracted on the Project be only subcontracted to a person, firm, or corporation who is or becomes party to the agreement.

Trucking includes the delivery of ready-mix, asphalt, aggregate, sand or other fill materials which are directly incorporated into the construction process as well as the off-hauling of debris and excess fill material and/or mud, per Article 5.4 of the agreement.

The furnishing of supplies, equipment or materials which are stockpiled for later use is not considered subcontracting.

Complete and submit the agreement's Letter of Assent (Information Handout B).

3-1.10 CONTRACT AND LABOR COMPLIANCE MANAGEMENT

3-1.10A General

To comply with legal and contractual reporting requirements, you and your subcontractors must use the Elation Systems online contract and labor compliance management system.

There is no charge for utilizing the system for the Project.

3-1.10B Requirements

You and your subcontractors are required to:

1. Be properly trained on the system
2. Maintain access to adequate information technology
3. Keep online reports up to date.

3-1.10B(1) Training

Within 5 business days of the Notice to Proceed date, you and all your subcontractors must contact Elation Systems at (925) 924-0340 to arrange for a free 1 hour training session for appropriate staff.

3-1.10B(2) Information Technology

The minimum information technology requirements are:

1. Internet connectivity
2. Hardware: Any device capable of running the specified browsers
3. Internet browser: Microsoft Internet Explorer 11 or latest version of Chrome, Firefox, or Safari

3-1.10B(3) Online Reporting

Elation Systems must be used to report:

1. Weekly certified payroll reports
2. Fringe benefits statements
3. Monthly progress payment status reports
4. Non-performance statements (to be kept current every week)

3-1.10C Non-Compliance Determination

If the Agency finds that you have not met the Contract and Labor Compliance Management System requirements, including submission of certified payroll documents, the Agency's Deputy Director (or designee) will meet with you for the purpose of determining whether or not you are out of compliance.

If the Deputy Director finds that you are out of compliance, you will be notified at least 5-days in advance of an administrative hearing before the Agency Director (or designee).

If the Director finds that there has been a violation, you will be notified of the sanctions to be imposed.

3-1.10D Non-Compliance Sanctions

Any or all of the following sanctions may be imposed if the Director has determined that the Contract and Labor Compliance Management System requirements have been violated:

1. Payment withholding—an additional 10 percent withholding of all further contract progress payments until the Director is satisfied that the condition of non-compliance has been corrected.
2. Contract suspension until the Director is satisfied that the condition of non-compliance has been corrected.
3. Contract termination and a collection of any appropriate damages from you.
4. Future contract ban—a determination may be sought from the Board of Supervisors to recognize you as non-responsible and ineligible to compete on future Agency contracts and other Alameda County agency contracts for a stated period of time or until the Director is satisfied that the condition of non-compliance has been corrected.

3-1.11 PAYEE DATA RECORD

Complete and deliver to the ~~Office~~ Engineer a Payee Data Record form when requested by the Agency.

3-1.12 RESERVED

3-1.13 FORM FHWA-1273

Not Used

3-1.14–3-1.17 RESERVED

3-1.18 CONTRACT EXECUTION

The successful bidder must sign the Contract form.

Deliver to the ~~Office~~ Engineer:

1. Signed Contract form, including the attached form FHWA-1273
2. Contract bonds
3. Documents identified in section 3-1.07
4. Small Business (SB) Participation Report form

The Office Engineer must receive these documents before the 10th business day after the Bidder receives the contract.

The Bidder's security may be forfeited for failure to execute the contract within the time specified (~~Pub Cent Code §§ 10181, 10182, and 10183~~).

The following is a copy of the Contract form (revision marks excluded):

SECTION 3

CONTRACT AWARD AND EXECUTION

Project No. XXXX

Contract No. C-XXXX

CONTRACT

The County of Alameda, a political subdivision of the State of California, acting by and through its Board of Supervisors, hereinafter called COUNTY, and (NAME OF CONTRACTOR), hereinafter called CONTRACTOR, hereby agree as follows:

1. It has been determined by the Board of Supervisors of COUNTY that it is necessary to secure all labor, material, equipment, mechanical workmanship, transportation and services for accomplishment of the project described as follows:

(PROJECT TITLE)

2. The plans, specifications, and CONTRACTOR'S bid proposal for the total bid price of \$XXXXXXXXXX said figure for the purpose of comparing bids only, exact payment for the job to be based on the unit prices, as stated in CONTRACTOR'S bid proposal, submitted **(BID DATE)**, for the aforesaid project, now on file in the office of the Clerk of the Board of Supervisors and the Construction Department, Public Works Agency, are hereby referred to as a more definite and distinct description of the work to be performed under this contract, and are hereby made a part of this contract the same as though fully set forth herein.

3. CONTRACTOR agrees and contracts with COUNTY to commence and complete the work of the aforesaid project in a skillful and substantial manner to the satisfaction of COUNTY in accordance with the plans and specifications for the project at the prices as set forth in CONTRACTOR'S bid proposal and within the time limit established by the contract specifications.

4. CONTRACTOR agrees that said CONTRACTOR and all pertinent subcontractors employed on the project will pay all employees involved in the work not less than the prevailing rate of per diem wages for the day, legal holiday, and overtime work as set forth within the appropriate General Prevailing Wage Determinations made by the Director of Industrial Relations, State of California, in accordance with Section 1770 of the Labor Code of the State of California. Said wage determinations are on file with the Director of Public Works, County of Alameda.

5. Sections 1725.5, 1775, 1776, and 1777.5 of the Labor Code apply to this contract. Section 1725.5 sets forth the responsibility of CONTRACTOR to be currently registered with the Department of Industrial Relations and qualified to perform public work. Section 1775 covers penalties to be assessed CONTRACTOR for failure to pay prevailing wage rates; Section 1776 sets forth the responsibility of CONTRACTOR to insure maintenance of accurate payroll records for both CONTRACTOR and any pertinent subcontractors; Section 1777.5 covers the employment of properly registered apprentices, and places the responsibility for compliance with this Section with CONTRACTOR for all apprenticeable occupations.

6. In accordance with Part 7, Chapter 1, Article 3 of the Labor Code, (a) eight hours labor constitutes a legal day's work; (b) work performed by employees of CONTRACTOR or pertinent subcontractors in excess of eight hours per day, and forty hours during any one week, shall be permitted upon compensation for all hours worked in excess of eight hours per day at a rate not less than one and one-half times the basic rate of pay; and (c) CONTRACTOR shall pay twenty-five dollars (\$25.00) each calendar day to COUNTY for each worker employed in the execution of the contract by CONTRACTOR or by any pertinent subcontractor where such worker or workers are required or permitted to work more than eight hours in any one calendar day and forty hours in any one calendar week in violation of said Article 3 of the Labor Code.

SECTION 3**CONTRACT AWARD AND EXECUTION**Project No. **XXXX**Contract No. C-**XXXX**

7. In accordance with Section 1861 of the Labor Code, CONTRACTOR hereby furnishes the following certification: "I am aware of the provisions of Section 3700 of the Labor Code which requires every employer to be insured against liability for worker's compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract."

IN WITNESS WHEREOF, the parties hereto have caused this contract to be executed by their respective authorized officers as of the date set forth below.

Date: _____

(NAME OF CONTRACTOR)

COUNTY OF ALAMEDA

By: _____

By: _____
President, Board of Supervisors, County
of Alameda, State of California

Address

(CONTRACTOR ADDRESS)Phone: **(XXX) XXX-XXXX**

Approved as to Form

Fax: **(XXX) XXX-XXXX**

DONNA ZIEGLER, County Counsel

License #: **XXXXXXXX**Classification: **XX**BY: _____
Deputy

Taxpayer ID#: _____

I hereby certify under penalty of perjury that the President of the Board of Supervisors was duly authorized to execute this document on behalf of the County of Alameda by a majority vote of the Board on _____; and that a copy has been delivered to the President as provided by Government Code Section 25103.

Date: _____

ATTEST:

Clerk of the Board of Supervisors, County of Alameda,
State of CaliforniaBY: _____
Deputy

SECTION 3**CONTRACT AWARD AND EXECUTION**Project No. **XXXX**Contract No. C-**XXXX****PERFORMANCE BOND**

KNOW ALL MEN BY THESE PRESENTS:

That the undersigned, **(CONTRACTOR NAME)**, _____ as Principal, and

_____,
a corporation duly authorized to do business in the State of California, as Surety, are hereby held and firmly bound unto the County of Alameda in the sum of **(DOLLAR AMOUNT OF PROJECT IN WORDS) DOLLARS (\$XXXXXXX)** in lawful money of the United States of America, for the payment of which sum well and truly to be made to the said County of Alameda, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

The condition of this obligation is such that whereas the Principal entered into a contract with the said County of Alameda, which contract is hereunto annexed and made a part hereof, for accomplishment of the project described as follows:

(PROJECT TITLE)

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform all the undertakings, covenants, terms, conditions, and agreements of the aforesaid contract, and if the Principal shall satisfy all claims and demands incurred under the said contract, and shall fully indemnify and save harmless the County of Alameda from all costs and damages which said County may suffer by reason of failure to do so, and shall reimburse and repay the County of Alameda all outlay and expense which the said County may incur in making good any default, then this obligation shall become null and void; otherwise, this obligation shall remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to work to be performed thereunder or the specifications accompanying the same shall in any wise affect this obligation on this bond, and said Surety does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the work or to the specifications.

IN WITNESS WHEREOF, this instrument is executed in four counterparts, each one of which shall be deemed an original, this _____ day of _____, 2018.

SURETY**(CONTRACTOR NAME)**
PRINCIPAL

By: _____

By: _____

Surety Address:Phone:

SECTION 3**CONTRACT AWARD AND EXECUTION**Project No. **XXXX**Contract No. C-**XXXX****PAYMENT BOND**

KNOW ALL MEN BY THESE PRESENTS:

That the undersigned, **(CONTRACTOR NAME)**, _____ as Principal, and

_____,
 a corporation duly authorized to do business in the State of California, as Surety, are hereby held and firmly bound unto the County of Alameda in the sum of **(DOLLAR AMOUNT OF PROJECT IN WORDS) DOLLARS (\$XXXXXXX)** in lawful money of the United States of America, for the payment of which sum well and truly to be made to the said County of Alameda, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

The condition of this obligation is such that whereas the Principal entered into a contract with the said County of Alameda, which contract is hereunto annexed and made a part hereof, for accomplishment of the project described as follows:

(PROJECT TITLE)

NOW, THEREFORE, if the Principal shall promptly make payment to all person, firms, subcontractors, corporation and/or others furnishing materials for or performing labor in the prosecution of the work provided for in the aforesaid contract, and any authorized extension or modification thereof, including all amounts due for materials, equipment, mechanical repairs, transportation, tools and services consumed or used in connection with the performance of such work, all amounts that may become due under the Unemployment Insurance Act of California or to the Franchise Tax Board, and for all labor performed in connection with such work whether by subcontractor or otherwise, and all other requirements provided in Civil Code Section 3248 or other requirements imposed by law, then this obligation shall become null and void; otherwise this obligation shall remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to work to be performed thereunder or the specifications accompanying the same shall in any wise affect its obligation on this bond, and said Surety does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the work or to the specifications.

IN WITNESS WHEREOF, this instrument is executed in four counterparts, each one of which shall be deemed an original, this _____ day of _____, 2018.

SURETY**(CONTRACTOR NAME)**
PRINCIPAL

BY: _____

BY: _____

Surety Address:Phone:

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SECTION 3

CONTRACT AWARD AND EXECUTION

3-1.19 BIDDERS' SECURITIES

The Agency keeps the securities of the 1st, 2nd, and 3rd low bidders until the contract has been executed.

The securities of the 1st, 2nd, and 3rd low bidders shall be returned in a reasonable period of time, but in no event shall that security be held by the Agency beyond 60 days from the time award is made.

The other bidders' securities, other than bidders' bonds, are returned upon determination of the 1st, 2nd, and 3rd low bidders, and their bidders' bonds are of no further effect (~~Pub Cont Code § 10184~~).

4 SCOPE OF WORK

4-1.01 GENERAL

Section 4 includes specifications related to the scope of work.

4-1.02 INTENT

The Contract intent is to provide for work completion using the best general practices.

The Contract exhibits the intent of the Agency in regard to the work and it may not be complete in every detail; it is to be considered as showing the intent only. You agree to furnish all labor and material for any detail that is necessary to carry out the intent of the Contract without extra charge.

No deviation from the Contract can be made without written consent. If you vary from the Contract in the form of quality of work, or the amount or value of the materials provided, the Engineer may order such improper work or material removed, remade, or replaced. In the event that the work is ordered changed, any other work disturbed or damaged by such alteration must be made good at your expense.

Nothing in the specifications voids the Contractor's public safety responsibilities.

4-1.03 WORK DESCRIPTION

Construct the work described on the *Notice to Bidders* and as described in the Contract.

The misplacement, addition or omission of any word, letter or punctuation mark will in no way change the intent of the Contract. Any part of the work, or any article pertaining thereto which is not specifically set forth in the Contract, but which is necessary for the proper completion of the work, is to be supplied and set in place at your expense, the same as if it had been described in the Contract. You must furnish and do all things necessary to complete the job in a workmanlike manner in accordance with the intent of the Contract.

Any errors or conflicts discovered in the Contract are to be interpreted so as to accomplish the intent of the Contract. You must furnish and do all things necessary by such interpretation to the satisfaction of the Engineer without additional expense to the Agency.

4-1.04 USE OF MATERIALS FOUND ON THE JOB SITE

You may use aggregate or other materials found in excavation that comply with the specifications. The Agency pays for the material excavated at the excavation item Contract price. Replace the quantity of material removed and used with an equal quantity of material. The material must have been designated for use in the work. Except for material used as structure backfill, the Agency does not pay for replacing the material. The Agency pays for replacing excavated material used for structure backfill at the Contract price for structure backfill. Do not excavate material from outside the excavation's slope and grade lines without authorization.

4-1.05 CHANGES AND EXTRA WORK

4-1.05A General

The Agency may make changes within the scope of work and add extra work (including alterations, deviations, additions to or deletions from the plans and specifications, as well as to increase, decrease, or delete any item or portion of work). The Engineer describes the changes and extra work, the payment basis, and any time adjustment in a Change Order.

A Change Order is approved when the Agency signs the Change Order.

Until the Agency approves a Change Order, continue to perform the work under the Contract unless the Engineer orders you to start the work described in the Change Order before its approval.

No oral statement will in any manner modify or affect the terms of the Contract.

Submit detailed cost data for a unit price adjustment for a bid item if (1) the Engineer requests the data or (2) you request a unit price adjustment resulting from a change of more than 25 percent in the bid item's

quantity. Payment adjustment provisions for quantity changes are under section 9-1.06, "Changed Quantity Payment Adjustments."

Maintain records as described under 5-1.27, "Records."

4-1.05B Work-Character Changes

The Agency adjusts the unit price for an item if:

1. Ordered plan or specification change materially changes the character of a work item from that on which the bid item price was based
2. Unit cost of the changed item differs from the unit cost of that item under the original plans and specifications
3. No approved Change Order addresses the payment

4-1.05C Significant Changes in the Character of Work

Section 4-1.05C applies to a federal aid contract.

The Engineer reserves the right to make in writing at any time during the work, such changes in quantities and such alterations in the work as are necessary to satisfactorily complete the project. Such changes in quantities and alterations shall not invalidate the Contract nor release the surety, and you agree to perform the work as altered.

If the alterations or changes in quantities significantly change the character of the work under the contract, whether such alterations or changes are themselves significant changes to the character of the work affecting other work cause such other work to become significantly different in character, an adjustment, excluding anticipated profit, will be made to the Contract. The basis for the adjustment shall be agreed upon prior to the performance of the work. If a basis cannot be agreed upon, then an adjustment will be made either for or against you in such amount as the Engineer may determine to be fair and equitable.

If the alterations or changes in quantities do not significantly change the character of the work to be performed under the Contract, the altered work will be paid for as provided elsewhere in the Contract.

The term "significant change" shall be construed to apply only to the following circumstances:

1. When the character of the work as altered differs materially in kind or nature from that involved or included in the original proposed construction; or
2. When a major item of work, as defined elsewhere in the Contract, is increased in excess of 125 percent or decreased below 75 percent of the original contract quantity. Any allowance for an increase in quantity shall apply only to that portion in excess of 125 percent of the original contract item quantity, or in the case of a decrease below 75 percent, to the actual amount of work performed.

4-1.05D Extra Work

New and unforeseen work is classified as extra work when the Engineer determines that the work is not covered by any of the various items for which there is a bid price or by combinations of those items. When the Engineer determines that portions of this work are covered by some of the various items for which there is a bid price or combinations of those items, the remaining portion of the work will be considered extra. Extra work also includes work specifically designated as extra work in the plans or specifications.

You must do the extra work upon receipt of an approved contract change order or other written order of the Engineer. Work performed under written order, but not an approved contract change order, will be paid by force account under section 9-1.04, "Force Account."

You are not entitled to payment for performing extra work without an approved contract change order or other written order.

4-1.06 DIFFERING SITE CONDITIONS ~~(23 CFR 635.109)~~**4-1.06A General**

Reserved

4-1.06B California Pub Cont Code § 7104

You must promptly, and before the following conditions are disturbed, notify the Agency, in writing, of any:

1. Material that you believe may be material that is hazardous waste, as defined in section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law. Upon the discovery of unanticipated asbestos and hazardous substances, comply with section 14-11.02.
2. Subsurface or latent physical conditions at the site differing from those indicated by information about the site made available to bidders prior to the deadline for submitting bids.
3. Unknown physical conditions at the site of any unusual nature, different materially from those ordinary encountered and generally recognized as inherent in work of the character provided for in the contract.

The Agency will promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, and cause a decrease or increase in your cost of, or the time required for, performance of any part of the work shall issue a change order under the procedures described in the Contract.

In the event that a dispute arises between you and the Agency whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in your cost of, or time required for, performance of any part of the work, you shall not be excused from any scheduled completion date provided for by the Contract, but shall proceed with all work to be performed under the Contract. You shall retain any and all rights provided either by the Contract or by law which pertain to the resolution of disputes and protests between the contracting parties.

~~4-1.06B Contractor's Notification~~

~~Promptly notify the Engineer if you find either of the following conditions:~~

1. ~~Physical conditions differing materially from either of the following:~~
 - 1.1. ~~Contract documents~~
 - 1.2. ~~Job site examination~~
2. ~~Physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work provided for in the Contract~~

~~Include details explaining the information you relied on and the material differences you discovered.~~

~~If you fail to promptly notify the Engineer, you waive your claim of a differing site condition for the period between your discovery of the differing site condition and your notification to the Engineer.~~

~~If you disturb the site after discovery and before the Engineer's investigation, you waive the differing site condition claim.~~

4-1.06C Title 23 Code of Federal Regulations § 635.109

Section 4-1.06C applies to a federal aid contract.

During the progress of the work, if subsurface or latent physical conditions are encountered at the site differing materially from those indicated in the Contract or if unknown physical conditions of an unusual nature, differing materially from those ordinarily encountered at the site, the party discovering such conditions shall promptly notify the other party in writing of the specific differing conditions before the site is disturbed and before the affected work is performed.

Upon written notification, the Engineer will investigate the conditions, and if it is determined that the conditions materially differ and cause an increase or decrease in the cost or time required for

the performance of any work under the contract, an adjustment, excluding anticipated profits, will be made and the Contract modified in writing accordingly. The Engineer will notify you of the determination whether or not an adjustment of the Contract is warranted.

No contract adjustment which results in a benefit to you will be allowed unless you have provided the required written notice.

No contract adjustment will be allowed under this clause for any effects caused on unchanged work.

~~4-1.06C Engineer's Investigation and Decision~~

~~Upon your notification, the Engineer investigates job site conditions and:~~

- ~~1. Notifies you whether to resume affected work~~
- ~~2. Decides whether the condition differs materially and is cause for an adjustment of time, payment, or both~~

4-1.07 VALUE ENGINEERING

4-1.07A General

Reserved

4-1.07B Value Engineering Change Proposal

You may submit a VECP to reduce any of the following:

1. Total cost of construction
2. Construction activity duration
3. Traffic congestion

Before preparing a VECP, meet with the Engineer to discuss:

1. Proposal concept
2. Permit issues
3. Impact on other projects
4. Project impacts, including traffic, schedule, and later stages
5. Peer reviews
6. Overall proposal merits
7. Review times required by the Agency and other agencies

The VECP must not impair the project's essential functions or characteristics, including:

1. Service life
2. Operation economy
3. Maintenance ease
4. Desired appearance
5. Design and safety

The VECP must include:

1. Description of the Contract specifications and drawing details for performing the work and the proposed changes.
2. Itemization of Contract specifications and plan details that would be changed.
3. Detailed cost estimate for performing the work under the existing Contract and under the proposed change. Determine the estimates under section 9-1.04.
4. Deadline for the Engineer to decide on the changes.
5. Bid items affected and resulting quantity changes.

The Agency is not required to consider a VECP. If a VECP is similar to a change in the plans or specifications being considered by the Agency at the time the proposal is submitted or if the proposal is

based on or similar to plans or specifications adopted by the Agency before Contract award, the Agency does not accept the VECP and may make these changes without VECP payments.

If the Agency does not approve a Change Order before the deadline stated in the VECP or other date you subsequently stated in writing, the VECP is rejected. The Agency does not adjust time or payment for a rejected VECP.

The Agency decides whether to accept a VECP and the estimated net construction-cost savings from adopting the VECP or parts of it. The Agency may require you to accept a share of the investigation cost as a condition of reviewing a VECP. In determining the estimated net construction-cost savings, the Agency excludes your VECP preparation cost and Agency's VECP investigation costs, including parts paid to you. After written acceptance, the Agency considers the VECP and deducts the agreed cost of the investigation.

If the Agency accepts the VECP or parts of it, the Agency issues a Change Order that:

1. Incorporates changes in the Contract necessary to implement the VECP or the parts adopted
2. Includes the Agency's acceptance conditions
3. States the estimated net construction-cost savings resulting from the VECP
4. Adjusts the payment so that the Change Order results in a credit to the Agency of 50 percent of the estimated net construction-cost savings, except if the VECP provides a reduction in traffic congestion or avoids traffic congestion.

If a VECP providing for a reduction in traffic congestion or avoiding traffic congestion is accepted by the Agency, the Agency adjusts the payment that results in a credit to the Agency of 40 percent of the estimated net construction-cost savings attributable to the VECP. Submit detailed traffic handling comparisons between the existing Contract and the proposed change, including estimates of the traffic volumes and congestion.

If a VECP providing for a reduction in working days is accepted by the Agency, 50 percent of the reduction is deducted from the Contract time.

The Agency may apply an accepted VECP for general use on other contracts.

If an accepted VECP is adopted for general use, the Agency pays only the contractor who first submitted the VECP and only for the contracts awarded to that contractor before the submission of the accepted VECP.

If the Agency does not adopt a general-use VECP, an identical or similar submitted proposal is eligible for acceptance.

4-1.07C Value Analysis Workshop

Not Used

4-1.08–4-1.12 RESERVED

4-1.13 CLEANUP

Before final inspection, leave the job site neat and presentable and dispose of:

1. Rubbish
2. Excess materials
3. Falsework
4. Temporary structures
5. Equipment

The Agency does not require you to remove warning, regulatory, or guide signs before Contract acceptance.

5 CONTROL OF WORK

5-1.01 GENERAL

Section 5 includes specifications related to the Contract parties' relations and Contract acceptance.

Furnish the resources except Agency-furnished materials required to complete the work as described in the Contract.

Provide QC.

Work is subject to the Agency's inspection, sampling, and testing. The Agency's inspection, sampling, and testing do not relieve you of your responsibility to provide QC.

Ensure the Agency's safe and unrestricted access to the work. Furnish facilities necessary for the Agency's inspection.

Where the means and methods to complete the work are not described in the Contract, choose the means and methods to complete the work.

Where the Contract describes more than 1 construction method or more than 1 type of material or equipment, the Agency does not assure that each construction method or type of material or equipment can be used successfully throughout all or any part of the project. You are responsible to use the alternative or alternatives that will accomplish the work under the conditions encountered.

Failure to comply with any Contract part is a waiver of your right to an adjustment of time and payment related to that part.

Use contract administration forms available at the [Elations Systems](#) website [or that are otherwise provided by the Agency](#).

5-1.02 CONTRACT COMPONENTS

A component in one Contract part applies as if appearing in each. The parts are complementary and describe and provide for a complete work.

If a discrepancy exists:

1. Governing ranking of Contract parts in descending order is:
 - ~~1.1. Special provisions~~
 - ~~1.2.1~~ Project plans
 - ~~1.3.2~~ [These](#) Revised standard specifications [with Special Provisions](#)
 - ~~1.4.3~~ Standard specifications
 - [1.4](#) [Standard Details/Design Guidelines](#)
 - 1.5. Revised standard plans
 - 1.6. Standard plans
 - 1.7. Supplemental project information
2. Written numbers and notes on a drawing govern over graphics
3. Detail drawing governs over a general drawing
4. Specific specification governs over a general specification
5. Specification in a section governs over a specification referenced by that section

[Use proper caution and care to verify dimensions. You are responsible for any discrepancies or errors or omissions that might have otherwise been avoided.](#)

If a discrepancy, [apparent error or omission](#) is found or confusion arises, submit an RFI [immediately upon discovery](#).

5-1.03 ENGINEER'S AUTHORITY

The Engineer makes the final decision on questions regarding the Contract, including:

1. Work quality and acceptability
2. Manner of performance of the work
3. Drawing and specification interpretation

SECTION 5

CONTROL OF WORK

4. Contract fulfillment
5. Time and progress rate
6. Measurement and payment

The Engineer has the authority to enforce or fulfill an order that you fail to fulfill promptly.

Failure to enforce a Contract part does not waive enforcement of any Contract provision.

The Engineer may reject work that does not comply with the Contract at any time, including after a payment has been made.

5-1.04–5-1.05 RESERVED

5-1.06 PROTESTS

You may protest an Engineer's decision by submitting an RFI.

5-1.07–5-1.08 RESERVED

5-1.09 PARTNERING

Not Used

5-1.10–5-1.11 RESERVED

5-1.12 ASSIGNMENT

The performance of the Contract or any Contract part may be assigned only with prior written consent from the Agency upon authorization granted by the Board. To request consent, submit a Contractor Action Request - Assignment of Contract Performance form. The Board does not consent to any requested assignment that would relieve you or your surety of the responsibility to complete the work or any part of the work.

If you assign the right to receive Contract payments, the Agency accepts the assignment upon the Engineer's receipt of a Contractor Action Request - Assignment of Contract Monies, Assignee Change of Name/Address form. Assigned payments remain subject to deductions and withholds described in the Contract. The Agency may use withheld payments for work completion whether the payments are assigned or not.

5-1.13 SUBCONTRACTING

5-1.13A General

No subcontract releases you from the Contract or relieves you of your responsibility for a subcontractor's work.

~~Before subcontracted work starts, submit a Subcontracting Request form.~~

Do not use a debarred contractor. For a list of debarred contractors, go to the Department of Industrial Relations' website.

If you violate Pub Cont Code § 4100 et seq., the Agency may exercise the remedies provided in Pub Cont Code § 4110. The Agency may refer the violation to the Contractors State License Board as provided under Pub Cont Code § 4111.

Except for a building-construction non-federal-aid contract, perform work equaling at least ~~30~~ 50 percent of the value of the original total bid with your employees and with equipment you own or rent, with or without operators.

Each subcontract must comply with the Contract.

The Agency encourages you to include a dispute resolution process in each subcontract.

Each subcontractor must have an active and valid:

1. State contractor license with a classification appropriate for the work to be performed (Bus & Prof Code § 7000 et seq.)
2. Public works contractor registration number with the Department of Industrial Relations

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Submit copies of subcontracts upon request.

Do not terminate or substitute any subcontractor listed in the Bid Proposal without authorization from the Agency.

To substitute any subcontractors listed on Subcontractor Commitment forms or to add subcontractors not listed on Subcontractor Commitment forms, submit a request through the online reporting system Elation Systems.

Upon request, immediately remove and do not again use a subcontractor who fails to satisfactorily prosecute the work.

5-1.13B Disadvantaged Business Enterprises

Not Used

5-1.13C Disabled Veteran Business Enterprises

Not Used

5-1.13D Non-Small Businesses

Not Used

5-1.13E Minority/Woman-Owned Business Enterprises

Section 5-1.13E applies to a non-federal aid contract when a Minority/Woman-Owned Business Enterprise (M/WBE) goal is specified in the Notice to Bidders.

M/WBEs must perform work or supply materials as listed on the M/WBE Bid Information form.

Do not terminate or substitute a listed M/WBE for convenience and perform the work with your own forces or those of an affiliate, a non-M/WBE firm, or another M/WBE firm or obtain materials from other sources without authorization from the Agency.

5-1.13F-5-1.13I Reserved

5-1.14-5-1.15 RESERVED

5-1.16 REPRESENTATIVE

Before starting work, assign a representative to:

1. Receive the Engineer's orders
2. Prosecute the Engineer's orders
3. Supervise the workers
4. Coordinate the subcontractors' work

The representative must be present at the job site while work is in progress. Submit the representative's name and telephone number so the representative can be easily contacted to perform emergency work while work is not in progress.

5-1.17 CHARACTER OF WORKERS

If a worker appears to the Engineer to be incompetent or acts disorderly or improperly, discharge the worker immediately upon request. Do not employ that worker again on the work.

5-1.18 COUNTY DRUG POLICY

You, your employees, your subcontractors and their employees must comply with Alameda County's policy of maintaining a drug free work place. Under no circumstances shall anyone unlawfully manufacture, distribute, possess or use controlled substances, as defined in 21 U.S. Code Section 812, including marijuana, heroin, cocaine, and amphetamines, at any Alameda County or District facility or work site. If you or any of your employees are convicted or plead nolo contendere to a criminal drug statute violation occurring at an Alameda County/District facility or work site, provide notice within 5-days. Violation of this provision constitutes a material breach of the Contract.

5.19 RESERVED**5-1.20 COORDINATION WITH OTHER ENTITIES****5-1.20A General**

Other entities may perform work at or near the job site and material sources at any time. Coordinate activities to avoid delays.

Each contractor or other entity performing work at or near the job or material site is responsible to the other for damage to work, persons, or property and for costs due to unnecessary delays.

5-1.20B Permits, Licenses, Agreements, and Certifications**5-1.20B(1) General**

Comply with PLACs. The Agency makes PLAC changes under section 4-1.05. Maintain a copy of each PLAC at the job site.

5-1.20B(2) Before Award

To make a change to a PLAC made available to you before award, submit the proposed change. The Agency considers the proposed change and at its discretion sends the proposed change to the appropriate authority for consideration.

5-1.20B(3) After Award

Confirm with the Engineer which after-award PLACs are obtained by the Agency and which are obtained by the Contractor.

To make a change to an after-award PLAC obtained by the Agency, submit the proposed change. The Agency considers the proposed change and at its discretion sends the proposed change to the appropriate authority for consideration.

Obtain those PLACs to be issued to you and pay the fees and costs associated with obtaining and complying with them. Submit copies of Contractor-obtained after-award PLACs.

Thirty days prior to the expiration of any PLAC required for Contract work, evaluate the work remaining and provide notice if it will be necessary to extend a PLAC time period.

5-1.20B(4) Contractor–Property Owner Agreement

Before utilizing non-County/District property or procuring material from or disposing of material on non-County/District nonhighway property:

1. Submit a written agreement from the property owner:
 - 1.1. For the use of the property
 - 1.2. Absolving the Agency from responsibility in connection with the property
2. Obtain authorization to start

Before Contract acceptance, submit a document signed by the owner of the material source or disposal site stating that the Contractor has complied with the Contractor-owner agreement.

5-1.20B(5) Agency—Property Owner Agreement (Permit to Enter and Do Work)

When necessary, the Agency acquires permission to enter and do work from various property owners along the job site to complete the construction of driveway and sidewalk conforms.

Comply with all the Permit to Enter conditions and work area boundaries. Do not perform any work outside the permit limits unless the property owner and the Engineer give written approval.

The Engineer will provide copies of permits before the start of construction.

5-1.20C Railroad Relations

If the Contract includes an agreement with a railroad company, the Agency makes the provisions of the agreement available in the *Information Handout* in the document titled "Railroad Relations and Insurance Requirements." Comply with the requirements in the document.

5-1.20D Occupied Improvements within the Right-of-Way

Reserved

5-1.20E Water Meter Charges

Reserved

5-1.20F Irrigation Water Service Charges

Reserved

5-1.20G–5-1.20J Reserved**5-1.21–5-1.22 RESERVED****5-1.23 SUBMITTALS****5-1.23A General**

Section 5-1.23 includes specifications for action and informational submittals.

Any submittal not specified as an informational submittal is an action submittal.

Submit action and informational submittals to the Engineer.

Each sheet of a submittal must include:

1. Contract number
2. ~~District~~ County–Route–Post Mile
3. Structure name and number, if any

The Agency rejects a submittal if it has any error or omission.

If the last day for submitting a document falls on a Saturday, Sunday, or holiday, it may be submitted on the next business day with the same effect as if it had been submitted on the day specified.

Convert foreign language documents to English and US customary units.

5-1.23B Action Submittals**5-1.23B(1) General**

Maintain a sequential list of action submittals except for samples, test samples, and material sources. With each individual submittal, submit a copy of the updated list.

Submit an action submittal before the start of the affected work to allow for review and corrections without work delays.

Except for test samples, obtain the Agency's authorization for action submittals before you perform work based on them.

Except for shop drawings and test samples, allow 15 days for review.

For a revised action submittal, allow the same number of days for review as for the original submittal.

The time allowed for the review of an action submittal starts when the Agency receives the submittal.

Do not change the scope of work on revised submittals.

The Agency's authorization of an action submittal does not void any Contract part.

5-1.23B(2) Shop Drawings

Submit shop drawings as specified and as otherwise required to control the work.

Each drawing and calculation sheet must be in black ink and sequentially numbered.

Each drawing sheet must:

1. Be 11 by 17 inches

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CONTROL OF WORK

2. Be on a minimum of 20 lb paper
3. Have text of a minimum nominal height of 5/32 inch

Each calculation sheet must:

1. Be 8-1/2 by 11 inches
2. Have text of a minimum 12-point font

Text and graphics must be legible for photocopying and reduction.

Calculations must demonstrate the design adequacy. Calculations specified as independently checked must be sealed and signed by an engineer who is registered as a civil engineer in the State and who did not seal and sign the drawings.

Allow 20 days for the review.

If multiple sets are submitted simultaneously or an additional set is submitted before the review of a previously submitted set is complete, designate the sequence that the sets are to be reviewed. Allow the review time specified plus 15 days for each additional set. A set consists of 40 or fewer sheets.

If drawings require corrections, the Agency:

1. Describes the deficiencies
2. Stamps the drawings with the date that the review stopped
3. Returns the drawings

Show the set revision number. Uniquely number each revised detail. Show the number in an inverted triangle near the revised portion of the detail. In a legend, describe and date the revision.

Upon review completion, the Agency returns 1 copy that shows the authorized date.

To make a change to an authorized drawing, submit it as specified for a new submittal. Note the changes.

A drawing authorized by the Agency does not relieve you from responsibility for deviation from the Contract, nor does it relieve responsibility for errors.

After the work shown on the drawings is complete, submit electronic copies of as-built drawings. Include an index of the sheet numbers and titles on the 1st sheet for each structure. Arrange the drawings in the drawing-number order shown in the index.

5-1.23B(3) Record Drawings

Prepare a complete set of record drawings that reflect all changes made during construction. Changes must be delineated in red and properly scaled.

Sign the record drawings as certification of their completeness and accuracy. Submit for approval.

5-1.23B(43)–5-1.23B(10) Reserved

5-1.23C Informational Submittals

Informational submittals include:

1. Certificates of compliance
2. Manufacturer's instructions not associated with drawing submittals
3. Notifications
4. PLACs
5. Subcontracts
6. QC test data, QC test results, and QC evaluation reports
- 7. Video Record of pre-work conditions**

5-1.23C(1) Video Record of Pre-Work Conditions

Before starting construction, and before the start of each phase of a staged project, you must video record the conditions of the project site and any adjacent area that might be affected by construction operations. Record the condition of curbs, gutters, sidewalks, driveways, roadway pavement, landscaping, and any private improvements immediately adjacent to the project site.

Submit the recorded video in a digital format before starting construction. Submitted digital storage media (DVDs, USB drives, etcetera) become the property of the Agency and will not be returned.

5-1.24 CONSTRUCTION SURVEYS**5-1.24A ~~General~~ Staking by Agency**

Section 5-1.24A applies when the Bid Item List does not include a Construction Surveys item or when a contingent Construction Surveys item in the Bid Item List is rejected.

The Agency will set the following when required:

1. Slope and/or offset stakes.
2. Grade stakes on the smoothed and compacted subgrade at the center line and near the edges of the roadway.
3. Alignment and grade stakes for culverts and structures
4. Other grade stakes, determined by the Engineer, to be required for checking of the work.

Submit an ACPWA survey request form in advance of your need for Agency-furnished stakes. After your submittal, the Agency starts staking within 6 business days.

Preserve stakes, marks, and control points placed by the Agency. If any are destroyed, the Agency replaces them at the Agency's earliest convenience and deducts the cost.

5-1.24B Staking by Contractor

Section 5-1.24B applies when the Bid Item List includes a Construction Surveys item, but only if it is accepted by the Agency when the item is identified as contingent.

The plans show sufficient information for a qualified surveyor to lay out the job. All working stakes must be established by a licensed Land Surveyor or a registered Civil Engineer authorized to practice land surveying in compliance with Section 8725 of the Business and Professions Code of California.

Furnish legible notes 10 calendar days before starting work in the area staked. The notes must show the location of the working stakes in relation to the construction center line or reference line, and all calculations used to reach the results of information written on the working stake marker. The location of working stakes must comply with the current edition of the Caltrans Surveys Manual - Chapter 12, "Construction Surveys."

Where work is shown adjacent to County/District right-of-way limits, provide right-of-way staking in accordance with the current edition of the Caltrans Surveys Manual – Chapter 10, "Right of Way Surveys." Demarcate at adjoining parcels.

Provide a qualified "Grade Setter" to check horizontal and vertical alignment of all improvements in progress so improvements will be constructed to conform to the lines, widths and grades as shown. The "Grade Setter" must be available to work with the County Inspector on checking or verifying all grade stakes, blue tops, form work, etc. when requested. The "Grade Setter" must provide all necessary equipment and tools to perform the work.

Regardless of any opportunity for the Agency to review the survey work, you assume absolute responsibility and liability for the accuracy and completeness of all aspects of the construction layout.

The Agency does not pay for any re-staking expenses unless an error is found in the plans. Restaking due to errors in the plans is paid for as change order work.

Preserve all survey points required for setting stakes to control the line and grade of work. If these controls are destroyed, the Agency replaces them at the Agency's earliest convenience and deducts the cost.

~~The Agency places stakes and marks under chapter 12, "Construction Surveys," of the Department's *Surveys Manual*.~~

~~Submit your request for Agency furnished stakes:~~

~~1. Once staking area is ready for stakes~~

~~2. On a Request for Construction Staking form~~

~~After your submittal, the Agency starts staking within 2 business days.~~

~~Preserve stakes and marks placed by the Agency. If the stakes or marks are destroyed, the Agency replaces them at the Agency's earliest convenience and deducts the cost.~~

5-1.25 RESERVED

5-1.26 RESERVED

5-1.27 RECORDS

5-1.27A General

Reserved

5-1.27B Record Retention

Under California Government Code § 8546.7, this contract is subject to the examination and audit by the California State Auditor at the request of the Agency or as part of any audit of the Agency, for a period of three years after final payment under the contract. Retain project records from bid preparation through:

1. Final payment
2. Resolution of claims, if any

For at least 3 years after the later of these, retain cost records, including records of:

1. Bid preparation
2. Overhead
3. Payrolls
4. Payments to subcontractors and suppliers
5. Cost accounting

Maintain the records in an organized way in the original format, electronic and hard copy, conducive to professional review and audit.

5-1.27C Record Inspection, Copying, and Auditing

Make your records available for inspection, copying, and auditing by State representatives for the same time frame specified under section 5-1.27B. The records of subcontractors and suppliers must be made available for inspection, copying, and auditing by State representatives for the same period. Before Contract acceptance, the State representative notifies the Contractor, subcontractor, or supplier 5 business days before inspection, copying, or auditing.

If an audit is to start more than 30 days after Contract acceptance, the State representative notifies the Contractor, subcontractor, or supplier of the date when the audit is to start.

5-1.27D Cost Accounting Records

Maintain cost accounting records for the project distinguishing between the following work cost categories:

1. Work performed based on bid item prices
2. Change order work other than extra work. Distinguish this work by:
 - 2.1. Bid item prices

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- 2.2. Force account
- 2.3. Agreed price
3. Extra work. Distinguish extra work by:
 - 3.1. Bid item prices
 - 3.2. Force account
 - 3.3. Agreed price
 - 3.4. Specialist billing
4. Work performed under potential claim records
5. Overhead
6. Work performed by subcontractors, suppliers, owner-operators, and professional services

Cost accounting records must include:

1. Final cost code lists and definitions
2. Itemization of the materials used and copies of the corresponding vendors' invoices
3. Direct cost of labor
4. Equipment rental charges
5. Workers' certified payrolls
6. Equipment:
 - 6.1. Size
 - 6.2. Type
 - 6.3. Identification number
 - 6.4. Hours operated

5-1.27E Change Order Bills

Maintain separate records for change order work costs.

~~Submit change order bills using the Caltrans Internet change order billing system.~~

~~The Contractor submitting and the Engineer authorizing a change order bill using the Internet change order billing system is the same as each party signing the bill.~~

~~The Agency provides billing system:~~

~~1. Training within 30 days of your request~~

~~2. Accounts and user identification to your assigned representatives after a representative has received training~~

~~Each representative must maintain a unique password.~~

5-1.28–5-1.29 RESERVED

5-1.30 NONCOMPLIANT AND UNAUTHORIZED WORK

Correct or remove and replace work that (1) does not comply with the Contract, (2) is unauthorized, or (3) both. The Agency does not pay for any of the following:

1. Corrective, removal, or replacement work
2. Unauthorized work

If ordered, submit a work plan for the corrective, removal, or replacement work.

If you fail to comply promptly with an order under section 5-1.30, the Agency may correct, remove, or replace noncompliant or unauthorized work. The Agency deducts the cost of this work.

If in the judgment of the Engineer, it is undesirable or impracticable to replace any defective or non-conforming work, the compensation to be paid for defective or non-conforming work will be reduced by Contract Change Order by such amount as in the judgment of the Engineer will be equitable.

5-1.31 JOB SITE APPEARANCE

Keep the job site neat. In areas visible to the public:

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SECTION 5

CONTROL OF WORK

1. If practicable, dispose of debris removed during clearing and grubbing concurrently with its removal. If stockpiling is necessary, dispose of debris weekly.
2. Furnish trash bins for construction debris. Place the debris in trash bins daily.
3. For falsework to be reused, stack the forms neatly and concurrently with their removal.

5-1.32 AREAS FOR USE

5-1.32A By Contractor

Occupy the County/District right-of-way highway only for purposes necessary to perform the work.

If no County/District-owned area is designated for the Contractor's use, you may arrange for temporary storage with the Agency.

Defend, indemnify, and hold the County or District, as appropriate, harmless to the same extent as under section 7-1.05.

The Agency does not allow temporary residences within the County/District right-of-way highway.

5-1.32B By Agency

The Agency reserves the right to use or occupy any part, or parts, of County/District right-of-way prior to Contract completion when the Engineer deems it safe for use or occupancy.

Exercising this right will in no way constitute acceptance of any part of work, nor will it affect the dates and times payments are due from the Agency to the Contractor, nor will it in any way prejudice the Agency's rights in the Contract or any bonds guaranteeing the same.

5-1.33 EQUIPMENT

Legibly stencil or stamp at a clearly visible location on each piece of equipment except hand tools an identifying number and:

1. On compacting equipment, its make, model number, and empty gross weight that is either the manufacturer's rated weight or the scale weight
2. On meters and on the load-receiving element and indicators of each scale, the make, model, serial number, and manufacturer's rated capacity

Submit a list describing each piece of equipment and its identifying number.

Upon request, submit the manufacturer's information that designates portable vehicle scale capacities.

For proportioning materials, use measuring devices, material plant controllers, and undersupports complying with section 9-1.02B.

Measuring devices must be tested and approved under California Test 109 in the Agency's presence by any of the following:

1. County Sealer of Weights and Measures
2. Scale Service Agency
3. Official of the Division of Measurement Standards

The indicator over-travel must be at least 1/3 of the loading travel. The indicators must be enclosed against moisture and dust.

Group the measuring system dials such that the smallest increment for each indicator can be read from the location at which proportioning is controlled.

5-1.34–5-1.35 RESERVED

5-1.36 PROPERTY AND FACILITY PRESERVATION

5-1.36A General

Preserve and protect:

1. Right-of-way Highway improvements and facilities

SECTION 5

CONTROL OF WORK

- 2 Adjacent property
3. Waterways
4. ESAs
5. Lands administered by other agencies
6. Railroads and railroad equipment
7. Non-County/District Nonhighway facilities, including utilities
8. Survey monuments
9. Agency's instrumentation
- 10 Temporary work
11. Roadside vegetation not to be removed

Comply with Govt Code § 4216 et seq. Notify the Engineer at least 3 business days before you contact the regional notification center. Contact Underground Service Alert (USA – phone 811) at least 2 working days prior to planned excavation work. Failure to contact the notification center prohibits excavation.

Immediately report damage to the Engineer.

If you cause damage, you are responsible.

The Agency may make a temporary repair to restore service to a damaged facility.

Where County/District property is damaged, the Agency will deduct from any or all payments due, an amount sufficient to repair any and all such damage, or replace any such damaged property, if such replacement is deemed to be necessary by the Engineer.

Install suitable safeguards to preserve and protect facilities from damage.

Install temporary facilities, such as sheet piling, cribbing, bulkheads, shores, or other supports, necessary to support existing facilities or to support material carrying the facilities.

5-1.36B Railroad Property

If working on or adjacent to railroad property, do not interfere with railroad operations.

For an excavation on or affecting railroad property, submit work plans showing the system to be used to protect the railroad facilities. Instead of the 15 days specified in section 5-1.23B, allow 65 days for the review of the plans.

If the Contract does not include an agreement with a railroad company, do not allow personnel or equipment on railroad property.

Prevent material, equipment, and debris from falling onto railroad property.

5-1.36C Non-County/District Nonhighway Facilities

5-1.36C(1) General

Before starting work that could damage or interfere with underground infrastructure, locate the infrastructure described in the Contract, including laterals and other appurtenances, and determine the presence of other underground infrastructure inferred from visible facilities, such as buildings, meters, and junction boxes.

Underground infrastructure described in the Contract may be in different locations from those described, and additional infrastructure may exist.

Notify the Engineer of the location and elevation of utilities in conflict with the proposed work. Utilities that are in conflict with proposed work must be rearranged by the company that owns the utility.

Coordinate with the utility owners on the rearrangement of these facilities. If this rearrangement delays work, the Agency will allow additional working days equal to the delay, but it will not compensate for equipment idle time during the rearrangement.

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Upon discovering an underground main or trunk line not described in the Contract, immediately notify the Engineer and the infrastructure owner. The Engineer orders the locating and protecting of the infrastructure. The locating and protecting is change order work. If ordered, repair infrastructure damage. If the damage is not due to your negligence, the repair is change order work.

Immediately notify the Engineer of a delay due to the presence of main-line underground infrastructure not described in the Contract or in a substantially different location.

Notify the Engineer if the infrastructure described in the Contract cannot be found. If after giving the notice, you find the infrastructure in a substantially different location from that described, finding the infrastructure is change order work.

5-1.36C(2) Non-County/District Nonhighway Facility Protection

Reserved

5-1.36C(3) Non-County/District Nonhighway Facility Rearrangement

The Agency may rearrange a non-County/District nonhighway facility during the Contract. Rearrangement of a non-County/District nonhighway facility includes installation, relocation, alteration, or removal of the facility.

The Agency may authorize facility owners and their agents to enter the County/District right-of-way highway to perform rearrangement work for their facilities or to make connections or repairs to their property. Coordinate activities to avoid delays.

If necessary rearrangement of underground infrastructure is not described in the Contract, the Engineer may order you to perform the work. The rearrangement is change order work.

Immediately notify the Engineer of a delay due to a rearrangement different from that described in the Contract.

If you want infrastructure rearrangement different from that described in the Contract:

1. Notify the Engineer
2. Make an arrangement with the infrastructure owner
3. Obtain authorization for the rearrangement
4. Pay the infrastructure owner any additional cost

The Agency does not adjust time or payment for a rearrangement different from that described the Contract.

The following Non-County/District facilities are planned for rearrangement during the progress of the Contract. Prior to doing any work in the vicinity of the facilities, notify the Engineer and facility owner(s) by at least the number of working days listed in the following table plus two weeks. The facilities will be relocated within the listed working days after notification is received by the Engineer and facility owners.

Facility Rearrangement Planned by the Agency

Facility	Location	Working Days
None	-	-

If the facilities listed above are not rearranged by the times specified and, if in the opinion of the Engineer, your operations are delayed as a consequence, the number of working days will be extended by the number of days that the facility rearrangement exceeds the number of listed days. No compensation will be allowed for idle time of equipment during the facility rearrangement.

5-1.36D Survey Monuments

Protect survey monuments ~~on and off the highway~~ in full compliance with California Business and Professions Code, chapter 15, § 8771.

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The County Surveyor provides a list of all currently known survey monuments within the limits of the work. The list includes location information to aid in monument recovery and is comprised of monuments in these categories:

Item	Monument Type	Description/Definition
I	Found (standard)	Readily found on the surface of the existing roadway with frame and cover.
II	Found (non-standard)	Found at or near the surface of the existing roadway and is most frequently a bolt or a railroad spike.
III	Not Found (standard)	An existing standard monument with frame and cover but not readily found on the existing roadway surface typically due to earlier overlay work. Further surveyor investigation is required to determine whether or not it still exists.
IV	Not Found (non-standard)	An existing non-standard monument not readily found on the existing roadway surface typically due to earlier overlay work. Further surveyor investigation is required to determine whether or not it still exists.

Engage the services of a Licensed Land Surveyor to reference all monuments from the list and file timely Pre-Construction and Post-Construction Corner Records on the form in Information Handout C with the County Surveyor. The County Surveyor furnishes examples of acceptable Corner Records.

These corner records are the factual basis for:

1. Confirming that an existing monument was not disturbed during construction
2. Providing the precise location for installing a new standard survey monument
3. Documenting that a monument did not exist at the time of construction. (Post-Construction Corner record not required.)

The Licensed Land Surveyor must submit the Corner Records to the County Surveyor according to this schedule:

1. For “Found” monuments (I & II above): submit Pre-Construction Corner Records a minimum of 15 days before starting construction.
2. For “Not Found” monuments (III & IV above): locate monuments and submit Pre-Construction Corner Records within 3 days after recovering and referencing monuments.

The Licensed Land Surveyor must diligently seek to find and recover all previously “Not Found” (III & IV above) monuments, using GPS navigation to points on the list, using metal detectors, and using direct measurements from found monuments.

Carefully expose the survey monument under the supervision of the Licensed Land Surveyor when s/he has determined the likely location for “Not Found” monuments. You must:

1. Ensure that the monument is not disturbed.
2. Immediately reference it as stated above.
3. Excavate a minimum of 12 inches below existing surface

Notify the Engineer 48 hours before starting work on locating the monuments.

Adjust all found and recovered standard survey monument frames and covers to grade (I & III above). Where necessary, install a new County standard frame and cover and deliver the existing frame and cover, cleaned, to the County Surveyor.

Install a new standard survey monument to replace all found and recovered non-standard monuments (II & IV above).

Submit Post-Construction Corner Records to the County Surveyor within 10 days of completing work affecting the final roadway surface.

The Agency imposes a fee of \$5,000 for each existing survey monument that is destroyed without a proper reference and Pre-Construction Corner Record filed.

Upon discovery of a survey monument not identified and located by the Agency, immediately:

1. Stop work near the monument
2. Notify the Engineer

Do not resume work near the monument until authorized.

A Pre-Construction Corner Record filed for a monument is paid for as Monument Preservation (Pre-Construction).

A Post-Construction Corner Record filed for a monument is paid for as Monument Preservation (Post-Construction).

5-1.36E Landscape

If you damage plants not to be removed:

1. Dispose of them unless the Engineer authorizes you to reduce them to chips and spread the chips within the County/District right-of-way highway at locations designated by the Engineer
2. Replace them

Replace plants with plants of the same species.

Replace trees with 24-inch-box trees.

Replace shrubs with no. 15-container shrubs.

Replace ground cover plants with plants from flats. Replace *Carpobrotus* ground cover plants with plants from cuttings. Plant ground cover plants 1 foot on center.

If a plant establishment or permanent erosion control establishment period is specified, replace plants before the start of the plant establishment or permanent erosion control establishment period; otherwise, replace plants at least 30 days before Contract acceptance.

Water each plant immediately after planting. Saturate the backfill soil around and below the roots or the ball of earth around the roots of each plant. Water as necessary to maintain plants in a healthy condition until Contract acceptance.

5-1.36F Irrigation Facilities

Keep existing irrigation facilities in place that are described to be removed, relocated, or modified until the Engineer determines they are no longer needed.

Maintain the existing water supply. If the existing water supply is interrupted for more than 3 consecutive days, provide an alternative water supply. Water the existing plants in the area irrigated from that water supply, including those maintained by the Agency, as necessary to maintain healthy plant growth.

If you and the Agency irrigate existing plants from the same water supply, furnish enough water to the Agency for watering plantings ~~on and off the highway~~ as necessary to maintain a healthy condition through Contract acceptance.

If you damage irrigation facilities not to be removed:

1. Remove and dispose of them.
2. Repair and replace damaged facilities within 10 days.
3. Use similar commercial-quality components from the same manufacturer or components that are compatible with the existing irrigation system if authorized.

SECTION 5

CONTROL OF WORK

4. After completing the repair or replacement of the facilities, perform an operational test in the presence of the Engineer. If you repair or replace the remote control valves, conduct the test with the irrigation controller in the automatic mode.

Notify the Engineer:

1. At least 4 business days before shutting off the water supply to any portion of the existing irrigation system
2. Immediately after restoring the water supply to any portion of the existing irrigation system

5-1.37 MAINTENANCE AND PROTECTION

5-1.37A General

Maintain and protect work until the Agency has granted relief from maintenance or accepted the Contract.

Do not remove any padlock used to secure a portion of the work until the Engineer is present to replace it. Notify the Engineer at least 3 business days before removing the lock.

Prevent construction equipment that exceeds the maximum weight limits in Veh Code Div 15 from operating on completed or existing treated base, pavement, or structures.

5-1.37B Load Limits

5-1.37B(1) General

To operate or move any oversized or overweight vehicle or special mobile equipment, obtain a special permit under Veh Code § 35780, except for ~~For~~ areas within the project limits and subject to the Contractor providing protective measures and repairing related damage, construction equipment exceeding the size or weight limits in Veh Code Div 15 may move over:

1. Alameda County roads ~~Public roads within the highway~~
2. Treated base or pavement under construction or completed
3. Culverts and pipes
4. Structures not open to traffic that are designed for AASHTO HS20-44 live loading, except culverts and pipes. Before crossing one of these structures, submit the dimensions and maximum axle loadings of the equipment; and unless a material hauling equipment lane on a bridge is shown on the drawings, comply with the following specifications:
 - 4.1. The maximum loading on a bridge due to pneumatic-tired truck and trailer combinations must not exceed:
 - 4.1.1. 28,000 lb for single axles
 - 4.1.2. 48,000 lb for tandem axles
 - 4.1.3. 60,000 lb total gross load for single vehicles
 - 4.1.4. 110,000 lb total gross load for truck and trailer or semi-trailer combinations
 - 4.2. The loading on a bridge due to 2- and 3-axle pneumatic-tired earthmovers must not exceed that shown in the following table:

**Allowable Construction Loading on Bridges for 2- and 3-Axle
Earthmovers**

Bridge girder center-to-center spacing (feet)	Maximum axle loading (pounds)
4	28,000
5	29,000
6	30,000
7	32,000
8	34,000
9	37,000
10 and over	40,000

NOTE: Minimum axle spacing:

For 2-axle earthmovers:

Axles 1 to 2 = 20 feet

For 3-axle earthmovers:

Axles 1 to 2 = 8 feet

Axles 2 to 3 = 20 feet

- Completed or existing base, pavement, and structures under the Caltrans *Transportation Permits Manual*, whether open to the public or not

Loads imposed on existing, new, or partially completed structures must not exceed the load-carrying capacity of the structure or any portion of the structure as determined by AASHTO LRFD with interims and California Amendments, Design Strength Limit State II. The f_c to be used in computing the load-carrying capacity must be the smaller of the following:

- Actual compressive strength at the time of loading
- Value of f_c shown on the plans for that portion of the structure or 2.5 times the value of f_c shown on the plans for portions of the structure where no f_c is shown

5-1.37B(2) Increased Load Carrying Capacity

Not Used

5-1.37B(3) Material Hauling Equipment Lane on Bridges

Not Used

5-1.38 MAINTENANCE AND PROTECTION RELIEF

You may request relief from maintenance and protection responsibilities for a completed work part. The work part must have been completed under the Contract and to the Engineer's satisfaction. Work parts eligible for relief include:

- Completed 0.3 mi section of roadway or a 0.3 mi section of one roadway of a divided highway or frontage road including:
 - Planned roadway protection work
 - Lighting
 - Required traffic control
 - Access facilities
- Bridge or other major structure
- Complete unit of a traffic control signal system or a highway lighting system
- Nonhighway facility constructed for another agency

If relieved by the Agency, you are not required to perform further work on that part of work. You are not responsible for damage to a relieved work part, including damage caused by traffic or the elements, except for that caused by your own activities or negligence.

5-1.39 DAMAGE REPAIR AND RESTORATION

5-1.39A General

Before Contract acceptance, restore damaged work to the same state of completion as before the damage. Restoration of damaged work includes restoration of erected falsework and formwork.

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CONTROL OF WORK

The Agency does not adjust payment for repair or restoration that the Engineer determines was caused by your failure to construct the work under the Contract or protect the work.

5-1.39B Damage Caused by an Act of God

Under Pub Cont Code § 7105, the Agency pays for repair or restoration to damaged work in excess of 5 percent of the total bid if the damage was proximately caused by an act of God and the work damaged was built in accordance with accepted and applicable building standards and the plans and specifications of the Agency.

Submit a request for repair or restoration work payment before performing work other than emergency work.

The Engineer determines the repair or restoration work cost under section 9-1.04 except markups are not allowed.

The Agency may change the Contract for the areas requiring repair or restoration. If the cost for the changes exceeds the repair or restoration cost based on the Bid Item List, the Engineer determines the payment adjustment under section 9-1.04.

5-1.39C Landscape Damage

5-1.39C(1) General

Repair slopes or other existing facilities that were damaged after starting job site activities and before starting plant establishment or permanent erosion control establishment.

As ordered, replace plants that have been damaged from either or both of the following conditions:

1. Ambient air temperature falling below 32 degrees F during the plant establishment period
2. Agency or its supplier restricting or stopping water delivery during the plant establishment period

This plant replacement work is change order work.

5-1.39C(2) Plant Establishment Period of 3 Years or More

Section 5-1.39C(2) applies if a plant establishment period of 3 years or more is included as a bid item shown on the Notice to Bidders.

Repair slopes or other existing facilities that were damaged before starting job site activities. This work is change order work.

Repair slopes or other existing facilities that were damaged by a change in the runoff pattern from that which existed on the date of the *Notice to Bidders* and was the result of work by others within the highway. This work is change order work.

Replace plants and repair slopes, irrigation systems, and other highway facilities damaged as a result of rain during the plant establishment period. The Agency pays 1/2 the accumulated costs in excess of the greater of 5 percent of the plant establishment work or \$2,000; the Contractor pays the other 1/2. The Engineer determines the repair cost under section 9-1.04.

5-1.40–5-1.41 RESERVED

5-1.42 REQUESTS FOR INFORMATION

Submit an RFI upon recognition of any event or question of fact arising under the Contract.

The Engineer responds to the RFI within 5 business days. Proceed with the work unless otherwise ordered. As an administrative remedy, you~~You~~ may protest the Engineer's response by:

1. Submitting an Initial Potential Claim Record form within 5 business days after receiving the Engineer's response
2. Complying with section 5-1.43

5-1.43 POTENTIAL CLAIMS ~~AND DISPUTE RESOLUTION~~**5-1.43A General**

Minimize and mitigate the impacts of work or events for which ~~you will make~~ a potential claim may arise, including compliance with the following required administrative procedures.

Submit a claim under section 9-1.17D(2).

For each potential claim, assign an identification number determined by chronological sequencing and the 1st date of the potential claim.

Use the identification number for each potential claim on the:

1. Initial Potential Claim Record form
2. Supplemental Potential Claim Record form
3. Full and Final Potential Claim Record form

~~Failure to comply with this procedure is:~~

- ~~1. Waiver of the potential claim and a waiver of the right to a corresponding claim for the disputed work in the administrative claim procedure~~
- ~~2. Bar to arbitration (Pub Cont Code § 10240.2)~~

5-1.43B Initial Potential Claim Record

Submit an Initial Potential Claim Record form within 5 business days of the Engineer's response to the RFI or within 5 business days from the date when a dispute arises due to an act or failure to act by the Engineer. The Initial Potential Claim Record form establishes the claim's nature and circumstances. The nature and circumstances must remain consistent.

The Engineer responds within 5 business days of receiving the form. Proceed with the work for which you will make a potential claim unless otherwise ordered.

Within 20 days of a request, provide access to the project records determined necessary by the Engineer to evaluate the potential claim.

5-1.43C Supplemental Potential Claim Record

Within 15 days of submitting the Initial Potential Claim Record form, submit a Supplemental Potential Claim Record form including:

1. Complete nature and circumstances causing the potential claim
2. Contract specifications supporting the basis of a claim
3. Estimated claim cost and an itemized breakdown of the individual costs stating how the estimate was determined
4. TIA

The Engineer evaluates the Supplemental Potential Claim Record form and responds within 20 days of receiving the submittal. To pursue a potential claim, comply with sections 5-1.43D and 5-1.43E.

If the estimated cost or effect on the scheduled completion date changes, update the Supplemental Potential Claim Record form information as soon as the change is recognized and submit this information.

5-1.43D Full and Final Potential Claim Record

Notify the Engineer within 10 days of the completion date of the potentially claimed work. The Engineer authorizes this completion date or notifies you of a revised date.

Within 30 days of the completion of the potentially claimed work, submit a Full and Final Potential Claim Record form including:

1. Detailed factual account of the events causing the potential claim, including:
 - 1.1. Pertinent dates
 - 1.2. Locations

- 1.3. Work items affected by the potential claim
2. Contract documents supporting the potential claim and a statement of the reasons these parts support entitlement
3. Itemized cost breakdown if a payment adjustment is requested. Segregate costs into the following categories:
 - 3.1. Labor, including:
 - 3.1.1. Individuals
 - 3.1.2. Classifications
 - 3.1.3. Regular and overtime hours worked
 - 3.1.4. Dates worked
 - 3.2. Materials, including:
 - 3.2.1. Invoices
 - 3.2.2. Purchase orders
 - 3.2.3. Location of materials either stored or incorporated into the work
 - 3.2.4. Dates materials were transported to the job site or incorporated into the work
 - 3.3. Equipment, including:
 - 3.3.1. Detailed descriptions, including make, model, and serial number
 - 3.3.2. Hours of use
 - 3.3.3. Dates of use
 - 3.3.4. Equipment rates at the rental rate listed in Labor Surcharge and Equipment Rental Rates in effect when the affected work related to the claim was performed
4. Detailed account of the time impact if a time adjustment is requested:
 - 4.1. Dates for the requested time.
 - 4.2. Reasons for a time adjustment.
 - 4.3. Contract documentation supporting the requested time adjustment.
 - 4.4. TIA. The TIA must demonstrate entitlement to a time adjustment.
5. Identification and copies of your documents and copies of communications supporting the potential claim, including certified payrolls, bills, canceled checks, job cost reports, payment records, and rental agreements
6. Relevant information, references, and arguments that support the potential claim

The Agency does not consider a Full and Final Potential Claim Record form that does not have the same nature, circumstances, and basis of claim as those specified on the Initial Potential Claim Record form and Supplemental Potential Claim Record form.

The Engineer evaluates the information presented in the Full and Final Potential Claim Record form and responds within 30 days of its receipt unless the Full and Final Potential Claim Record form is submitted after Contract acceptance, in which case, a response may not be provided. The Engineer's receipt of the Full and Final Potential Claim Record form must be evidenced by postal return receipt or the Engineer's written receipt if delivered by hand.

5-1.43E Alternative Dispute Resolution

Not Used

5-1.43F Reserved

5-1.44–5-1.45 RESERVED

5-1.46 FINAL INSPECTION AND CONTRACT ACCEPTANCE

When you complete the work, request the Engineer's final inspection.

If the Engineer determines that the work is complete, the Engineer recommends Contract acceptance. Immediately after Contract acceptance, you are relieved from:

1. Maintenance and protection duties
2. Responsibility for injury to persons or property or damage to the work occurring after Contract acceptance except as specified in section 5-1.47

5-1.47 GUARANTEE

Guarantee that work remains free from substantial defects for 1 year after Contract acceptance except for work parts for which you were relieved of maintenance and protection. Guarantee each of these relieved work parts for 1 year after the relief date.

The guarantee excludes damage or displacement caused by an event outside your control, including:

1. Normal wear and tear
2. Improper operation
3. Insufficient maintenance
4. Abuse
5. Unauthorized change
6. Act of God

During the guarantee period, repair or replace each work part having a substantial defect.

The Agency does not pay for corrective work.

During corrective work activities, provide the same insurance specified before Contract acceptance.

The Contract bonds must be in force until the later of (1) the expiration of the guarantee period or (2) the completion of the corrective work.

If a warranty specification conflicts with section 5-1.47, comply with the warranty specification.

During the guarantee period, the Engineer monitors the completed work. If the Engineer finds work having a substantial defect, the Engineer lists the defective work parts and furnishes you the list.

Within 10 days of receipt of the list, submit for authorization a detailed plan for correcting the work. Include a schedule that includes:

1. Start and completion dates
2. List of labor, equipment, materials, and any special services you plan to use
3. Work related to the corrective work, including traffic control and temporary and permanent pavement markings

The Engineer notifies you when the plan is authorized. Start the corrective work and related work within 15 days of notice.

If the Engineer determines corrective work is urgently required to prevent injury or property damage:

1. The Engineer furnishes you an order to start emergency repair work and a list of parts requiring corrective work
2. Mobilize within 24 hours and start work
3. Submit a corrective work plan within 5 business days of starting the emergency repair work

If you fail to perform the work as specified, the Agency may perform the work and bill you.

5-1.48 EXTENDED GUARANTEE

Further guarantee that work specified in the following table, when included as part of the Contract work, remains free from substantial defects for the specified duration after contract acceptance:

Extended Guarantee Items and Durations

Item	Total Duration
Prefabricated Detectable Warning Surfaces	5 years

6 CONTROL OF MATERIALS

6-1 GENERAL

6-1.01 GENERAL

Section 6 includes specifications related to the control of materials.

Store materials and samples in a way that preserves the quality and facilitates prompt inspection.

Material incorporated into the work must be new, unless recycled or remanufactured products are authorized by the Engineer.

Before the preconstruction conference, submit material source information on a Notice of Materials to be Used form (Caltrans form CEM-3101).

6-1.02 AGENCY-FURNISHED MATERIALS

The Agency will furnish materials listed in the following table:

Agency-Furnished Materials	
Description	Quantity
Temporary paper construction "no parking" signs <u>The Agency no longer provides temporary no parking signs. Furnish signs, minimally 11"x17" in size, similar to the sample in Information Handout J.</u>	as needed
Special funding signs (small: 24 by 30 inches)	Reserved
Special funding signs (large: 72 by 36 inches)	Reserved
Special speed limit signs (48 by 28 inches)	Reserved
Letter stencils (for painted pavement markings and arrows)	as needed
Temporary construction entrance panels	Reserved

Request Agency-furnished materials except sign panels at least 15 days before their scheduled installation. Request sign panels at least 30 days before their scheduled installation.

If the Agency furnishes the material:

1. At the job site, unload and store the material
2. At a location other than the job site, deliver the material to the job site and store it

Agency-furnished material is available at: ACPWA Corporation Yard, 951 Turner Ct, Hayward.

~~The Engineer orders the return and disposal of surplus Agency furnished material. This returning and disposing of material is change order work.~~

You are responsible for the cost of replacing lost or damaged Agency-furnished material. The Agency deducts replacement costs. Agency-furnished material not used in the work remains the property of the Agency and must be returned to the Corporation Yard when not used in the work.

Unless specified otherwise, unreturned or damaged items will cost:

1. \$150 per sign
2. \$400 per letter stencil if they are not returned with 48 hours after pickup from the Hayward Corporation Yard (unless a time extension is granted).
3. \$10,000 per temporary construction entrance panel

6-1.03 LOCAL MATERIALS

Local material must be rock, sand, gravel, earth, or mineral material other than local borrow, or selected material obtained or produced from a source in the work vicinity, specifically for use on the project. Local borrow must not be a material from an established commercial source.

SECTION 6

CONTROL OF MATERIALS

Upon your request, the Agency tests material for quality characteristics from an untested local source. If satisfactory material from that source is used in the work, the Agency does not charge you for the tests; otherwise, the Agency deducts the test costs.

6-1.04 BUY AMERICA

6-1.04A General

Reserved

6-1.04B Crumb Rubber ~~(Pub Res Code § 42703(d))~~

Section 6-1.04B applies if the Project is funded in part by a grant under Pub Res Code § 42872.1.

Furnish crumb rubber with a certificate of compliance. Crumb rubber must be:

1. Produced in the United States
2. Derived from waste tires taken from vehicles owned and operated in the United States

6-1.04C Steel and Iron Materials

Section 6-1.04C applies if the Project is Federally funded.

Steel and iron materials must be produced ~~melted and manufactured~~ in the United States except:

1. Foreign pig iron and processed, pelletized, and reduced iron ore may be used in the domestic production of the steel and iron materials
2. If the total combined cost of the materials does not exceed the greater of 0.1 percent of the total bid or \$2,500, materials produced outside the United States may be used if authorized

Furnish steel and iron materials to be incorporated into the work with certificates of compliance and certified mill test reports. Mill test reports must indicate where the steel and iron were melted and manufactured.

Production includes:

1. Processing steel and iron materials, including smelting or other processes that alter the physical form or shape (such as rolling, extruding, machining, bending, grinding, and drilling) or chemical composition
2. Coating application, including epoxy coating, galvanizing, and painting, that protects or enhances the value of steel and iron materials.

All melting and manufacturing processes for these materials, including an application of a coating, must occur in the United States. Coating includes all processes that protect or enhance the value of the material to which the coating is applied.

6-1.05 SPECIFIC BRAND OR TRADE NAME AND SUBSTITUTION

A reference to a specific brand or trade name establishes a quality standard and is not intended to limit competition. You may use a product that is equal to or better than the specified brand or trade name if it is approved as equal or better authorized.

Submit a substitution request within 35 days after award. ~~with a time period that:~~

- ~~1. Follows Contract award~~
- ~~2. Allows 30 days for review~~
- ~~3. Causes no delay~~

Include substantiating data with the substitution request that proves that substitution:

1. Causes no delay
2. Is of equal or better quality and suitability

The following table lists materials, products, items, or services specified in the Contract and any known equal manufactured in California:

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Specific Brand or Trade Name and Substitution

Specified material, product, item or service	Manufactured 'equal'
Reserved	Reserved

6-2 QUALITY ASSURANCE**6-2.01 GENERAL****6-2.01A General**

Section 6-2 includes provisions related to quality.

The Agency uses a Quality Assurance Program (QAP) to ensure a material is produced to comply with the Contract.

You may examine the records and reports of tests the Agency performs if they are available at the job site.

Schedule work to allow time for QAP.

Quality assurance includes all activities used to (1) provide an overall level of quality for the project and (2) determine compliance with the Contract documents.

Quality control includes sampling, testing, and inspections performed under your QC program to (1) control material quality and (2) ensure the specified quality characteristics for the project are met.

Agency acceptance includes sampling, testing, and inspections performed by the Agency to verify compliance with the Contract.

The Caltrans independent assurance program is described in the *Caltrans Independent Assurance Manual: Procedures for Accreditation of Laboratories and Qualification of Testers*. For the manual, go to the METS website.

For a material specified to comply with a State Specification number, the material may comply with a later version of the specification. Obtain State Specifications from METS.

For a material specified to comply with a requirement for a quality characteristic shown in the following table, the quality characteristic is tested under the corresponding California Test:

California Tests

Quality characteristic	California Test
Relative compaction	216 or 231
Sand equivalent	217
Resistance (R-value)	301
Gradation (sieve analysis)	202
Durability index	229

6-2.01B Authorized Facility Audit Lists

Section 6-2.01B applies where a facility is specified to be on an Authorized Facility Audit List.

An audit authorized by the Agency not more than 3 years before completion of the fabrication process is acceptable if the Agency determines the audit was for the same type of work to be performed.

For procedures to be included on an Authorized Facility Audit List, go to the Caltrans Authorized Facility Audit List website.

6-2.01C Authorized Material Lists

Section 6-2.01C applies where a material is specified to be on an Authorized Material List.

The material must be on an Authorized Material List before it is incorporated into the work.

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SECTION 6

CONTROL OF MATERIALS

For procedures to be included on an Authorized Material List, go to the Caltrans Authorized Material List website.

6-2.01D Authorized Material Source Lists

Section 6-2.01D applies where a material is specified to be on an Authorized Material Source List.

The material source must be on an Authorized Material Source List before the item from the source is incorporated into the work.

For procedures to be included on an Authorized Material Source List, go to the Authorized Material Source List website.

6-2.01E Material Source Inspection and Testing

Not Used

6-2.01F Test Samples

6-2.01F(1) General

~~Section 6-2.01F applies where a test sample is specified or if a test sample is requested.~~

Submit, at no cost to the Agency, representative samples of all materials to be used in the work.

Submit material to be tested with a Sample Identification Card. ~~For the card, go to the METS website.~~

6-2.01F(2) Samples of Materials to be Used

All materials and workmanship entering the work must be equal to the samples submitted and approved.

If requested, obtain the Agency's authorization for the material before incorporating the material represented by the test sample into the work.

6-2.01F(3) Samples of Materials Incorporated in Work

Notify the Engineer 10 days before taking a sample.

Restore work immediately after sampling.

~~6-2.01G–6-2.01K Reserved~~

6-2.02 QUALITY CONTROL

6-2.02A General

Material production and testing equipment must measure accurately and precisely.

6-2.02B Quality Control Program

Develop, implement, and maintain a QC program.

Prepare and maintain QC records, including:

1. Names and qualifications of:
 - 1.1. Samplers
 - 1.2. Testers
 - 1.3. Inspectors
2. Testing laboratories' identification and certifications
3. Testing equipment calibrations and certifications
4. Inspection reports
5. Sampling and testing records organized by date and type of material
6. Test results with comparison of quality characteristic requirements
7. Test results in relation to action and any suspension limits
8. Records of corrective actions and suspensions

Within 24 hours, notify the Engineer of any noncompliance identified by your QC program.

SECTION 6

CONTROL OF MATERIALS

Allow the Agency access to all QC records.

Submit QC test data and QC test results within 2 business days of test completion.

6-2.02C Quality Control Manager

Section 6-2.02C applies to work requiring a QC manager.

The QC manager must be responsible directly to you for the quality of the work, including materials and workmanship performed by you and your subcontractors.

Assign the QC manager before the start of the affected work. The QC manager must be the sole individual responsible for:

1. Receiving, reviewing, and approving all correspondence, submittals, and reports before they are submitted to the Agency
2. Signing the QC plan
3. Implementing the QC plan
4. Maintaining the QC records

The QC manager must be your employee or must be hired by a subcontractor providing only QC services. The QC manager must not be employed or compensated by a subcontractor or by other persons or entities hired by subcontractors who will provide other services or materials for the project.

Notify the Engineer of the name and contact information of the QC manager.

6-2.02D Quality Control Plans

Submit 7 copies of each authorized QC plan.

Make 1 copy available at each location where work is performed.

6-2.03 AGENCY ACCEPTANCE

6-2.03A General

The Agency may use multiple acceptance methods for a material.

Specifications in sections titled "Agency Acceptance" do not include all requirements on which the Agency makes its acceptance.

The Agency may inspect, sample, and test materials for compliance with the Contract at any time.

Allow the Agency to record, including photograph and video, to ensure a material is produced to comply with the Contract.

You may examine the records and reports of tests the Agency performs.

Schedule work to allow time for the Agency's inspection, sampling, and testing.

The Agency deducts testing costs for work that does not comply with the Contract.

The Agency may retest material previously tested and authorized for use. If the Agency notifies you of a retest, furnish resources for retesting.

6-2.03B Job Site Inspection and Testing

Section 6-2.03B applies if a material is to be inspected or tested at the job site.

The material must be authorized for use before it is incorporated into the work.

6-2.03C Certificates of Compliance

Section 6-2.03C applies (1) where a certificate of compliance is specified and (2) if any material is produced outside the United States.

Submit a certificate of compliance:

SECTION 6

CONTROL OF MATERIALS

1. Before the material is incorporated into the work
2. For each lot of the material. Identify the lot on the certificate
3. Signed by the producer of the material and stating that the material complies with the Contract

7 LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

7-1.01 GENERAL

Section 7 includes specifications related to your:

1. Compliance with laws
2. Responsibilities for public safety and convenience
3. Responsibilities for indemnification, insurance, and liability

7-1.02 LAWS

7-1.02A General

Comply with laws, regulations, orders, and decrees **which in any way affect or relate to or are** applicable to the project. Indemnify and defend the County/District against any claim or liability arising from the violation of a law, regulation, order, or decree by you or your employees. Immediately report to the Engineer a discrepancy or inconsistency between the Contract and a law, regulation, order, or decree.

If the Agency incurs any fines or penalties because of your failure to comply with a law, regulation, order, or decree, the Agency deducts the amount of the fine or penalty.

Immediately notify the Engineer if a regulatory agency requests access to the job site or to records. Submit a list of documents provided to the agency and issued enforcement actions.

7-1.02B US Fair Labor Standards Act

Comply with 29 USC § 201 et seq.

7-1.02C Emissions Reduction

Submit to the Agency the following certification before performing the work:

I am aware of the emissions reduction regulations being mandated by the California Air Resources Board. I will comply with such regulations before commencing the performance of the work and maintain compliance throughout the duration of this Contract.

Contract signing constitutes submittal of this certification.

7-1.02D ADA and the Civil Rights Act

Comply with the American with Disabilities Act and the Civil Rights Act of 1964. No person shall, on the grounds of race, creed, color, disability, sex, sexual orientation, national origin, age, religion, Vietnam era Veteran's status, political affiliation, or any other non-merit factor, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under this contract.

Comply with and include the following provisions in your subcontracts for this Project:

1. In all solicitations or advertisements for applicants for employment placed as a result of this contract, state that it is an "Equal Opportunity Employer" or that all qualified applicants will receive consideration for employment without regard to their race, creed, color, disability, sex, sexual orientation, national origin, age, religion, Vietnam era Veteran's status, political affiliation, or any other non-merit factor.
2. If requested to do so, certify that you have not, in the performance of this contract, discriminated against applicants or employees because of their race, creed, color, disability, sex, sexual orientation, national origin, age, religion, Vietnam era Veteran's status, political affiliation, or any other non-merit factor.
3. If requested to do so, provide the Agency access to copies of all of your records pertaining or relating to your employment practices, except to the extent such records or portions of such records are confidential or privileged under state or federal law.
4. Recruit vigorously and encourage minority- and women-owned businesses to bid its subcontracts.
5. Nothing contained in this contract shall be construed in any manner so as to require or permit any act which is prohibited by law.

Post the Equal Employment Opportunity Practices Provisions Policy in a conspicuous place at each construction site. A sample form will be provided.

7-1.02E Civil Rights Act – Title VI Assurances

Not Used

7-1.02F–7-1.02H Reserved

7-1.02I Government Code

7-1.02I(1) General

Reserved

7-1.02I(2) Nondiscrimination

~~Under 2 CA Code of Regs § 11105:~~

- ~~1. During the performance of this contract, the recipient, contractor, and its subcontractors shall not deny the contract's benefits to any person on the basis of race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, genetic information, marital status, sex, gender, gender identity, gender expression, age, sexual orientation, or military and veteran status, nor shall they discriminate unlawfully against any employee or applicant for employment because of race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, genetic information, marital status, sex, gender, gender identity, gender expression, age, sexual orientation, or military and veteran status. Contractor shall insure that the evaluation and treatment of employees and applicants for employment are free of such discrimination.~~
- ~~2. Contractor shall comply with the provisions of the Fair Employment and Housing Act (Gov. Code, § 12900 et seq.), the regulations promulgated thereunder (Cal. Code Regs., tit. 2, § 11000 et seq.), the provisions of Article 9.5, Chapter 1, Part 1, Division 3, Title 2 of the Government Code (Gov. Code, §§ 11135-11139.5), and the regulations or standards adopted by the awarding state agency to implement such article.~~
- ~~3. Contractor or recipient shall permit access by representatives of the Department of Fair Employment and Housing and the awarding state agency upon reasonable notice at any time during the normal business hours, but in no case less than 24 hours' notice, to such of its books, records, accounts, and all other sources of information and its facilities as said Department or Agency shall require to ascertain compliance with this clause.~~
- ~~4. Recipient, contractor and its subcontractors shall give written notice of their obligations under this clause to labor organizations with which they have a collective bargaining or other agreement.~~
- ~~5. The contractor shall include the nondiscrimination and compliance provisions of this clause in all subcontracts to perform work under the contract.~~

~~Under 2 CA Code of Regs § 11122:~~

STANDARD CALIFORNIA NONDISCRIMINATION CONSTRUCTION CONTRACT SPECIFICATIONS (GOV. CODE SECTION 12990)

~~These specifications are applicable to all state contractors and subcontractors having a construction contract or subcontract of \$5,000 or more.~~

- ~~1. As used in the specifications:~~
 - ~~a. "Act" means the Fair Employment and Housing Act.~~
 - ~~b. "Administrator" means Administrator, Office of Compliance Programs, California Department of Fair Employment and Housing, or any person to whom the Administrator delegates authority;~~
- ~~2. Whenever the contractor or any subcontractor subcontracts a portion of the work, it shall include in each subcontract of \$5,000 or more the nondiscrimination clause in this contract directly or through incorporation by reference. Any subcontract for work involving a~~

~~construction trade shall also include the Standard California Construction Contract Specifications, either directly or through incorporation by reference.~~

- ~~3. The contractor shall implement the specific nondiscrimination standards provided in paragraphs 6(a) through (e) of these specifications.~~
- ~~4. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the contractor has a collective bargaining agreement, to refer members of any group protected by the Act shall excuse the contractor's obligations under these specifications, Government Code section 12990, or the regulations promulgated pursuant thereto.~~
- ~~5. In order for the nonworking training hours of apprentices and trainees to be counted, such apprentices and trainees must be employed by the contractor during the training period, and the contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor or the California Department of Industrial Relations.~~
- ~~5. In order for the nonworking training hours of apprentices and trainees to be counted, such apprentices and trainees must be employed by the contractor during the training period, and the contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor or the California Department of Industrial Relations.~~
6. The contractor shall take specific actions to implement its nondiscrimination program. The evaluation of the contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The contractor must be able to demonstrate fully its efforts under steps a. through e. below:
 - a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and at all facilities at which the contractor's employees are assigned to work. The contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the contractor's obligations to maintain such a working environment.
 - b. Provide written notification within seven days to the director of the DFEH when the referral process of the union or unions with which the contractor has a collective bargaining agreement has impeded the contractor's efforts to meet its obligations.
 - c. Disseminate the contractor's equal employment opportunity policy by providing notice of the policy to unions and training, recruitment and outreach programs and requesting their cooperation in assisting the contractor to meet its obligations; and by posting the company policy on bulletin boards accessible to all employees at each location where construction work is performed.
 - d. Ensure all personnel making management and employment decisions regarding hiring, assignment, layoff, termination, conditions of work, training, rates of pay or other employment decisions, including all supervisory personnel, superintendents, general foremen, on-site foremen, etc., are aware of the contractor's equal employment opportunity policy and obligations, and discharge their responsibilities accordingly.
 - e. Ensure that seniority practices, job classifications, work assignments, and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the equal employment opportunity policy and the contractor's obligations under these specifications are being carried out.
- ~~7. Contractors are encouraged to participate in voluntary associations that assist in fulfilling their equal employment opportunity obligations. The efforts of a contractor association, joint contractor union, contractor community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under these specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on equal employment opportunity in the industry, ensures that the concrete benefits of the program are reflected in the contractor's workforce participation, and can provide access to documentation that demonstrates the effectiveness of actions taken on behalf of the contractor. The obligation to comply, however, is the contractor's.~~
- ~~8. The contractor is required to provide equal employment opportunity for all persons. Consequently, the contractor may be in violation of the Fair Employment and Housing Act~~

SECTION 7

LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

~~(Government Code section 12990 et seq.) if a particular group is employed in a substantially disparate manner.~~

- ~~9. The contractor shall not use the nondiscrimination standards to discriminate against any person because race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, genetic information, marital status, sex, gender, gender identity, gender expression, age, sexual orientation, or military and veteran status.~~
- ~~10. The contractor shall not enter into any subcontract with any person or firm decertified from state contracts pursuant to Government Code section 12990.~~
- ~~11. The contractor shall carry out such sanctions and penalties for violation of these specifications and the nondiscrimination clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Government Code section 12990 and its implementing regulations by the awarding agency. Any contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Government Code section 12990.~~
- ~~12. The contractor shall designate a responsible official to monitor all employment related activity to ensure that the company equal employment opportunity policy is being carried out, to submit reports relating to the provisions hereof as may be required by OCP and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, status, (e.g., mechanic, apprentice trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in any easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.~~

7-1.02J Non-Compliance with Equal Employment Opportunity

7-1.02J(1) General

Section 7-1.02J provides provisions for the determination of and the sanctions for non-compliance with the Equal Employment Opportunity Practices policy.

7-1.02J(2) Determination of Non-Compliance

If the Agency finds that the Contractor has violated the Equal Employment Opportunity Practices Provisions policy, the Director (or designee) shall hold a meeting with the Contractor for the purpose of determining whether the Contractor is out of compliance. If after the meeting the Contractor is found to be still out of compliance, the Contractor will be notified of a public hearing. The public hearing will be held before the Board of Supervisors with a minimum five calendar-day notice to the Contractor. If the Board of Supervisors finds that there has been a violation, the County will notify the Contractor in writing of the sanctions to be imposed.

In addition, the Agency shall deem a finding by the Fair Employment Practice Commission that there was willful violation of the California Fair Employment Act also to be a violation by the Contractor of the Equal Employment Opportunity Practices Provisions requirements of the contract, and such violation shall be subject to the sanctions provided herein.

7-1.02J(3) Sanctions

A finding at the public hearing that there has been violation of the Equal Employment Opportunity Practices Provisions requirements of the contract shall be cause for the Board of Supervisors to impose any or all of the following sanctions:

1. Withhold an additional ten percent (10%) of all further contract progress payments until the Contractor provides evidence satisfactory to the Board of Supervisors that the condition of non-compliance has been corrected.
2. Suspend the contract until such time as the Contractor provides evidence satisfactory to the Board of Supervisors that the condition of non-compliance has been corrected.
3. Terminate the contract and collect appropriate damages from the Contractor.
4. Declare that the Contractor is a non-responsible bidder, and is ineligible to make bids on future County contracts for a stated period of time or until the Contractor can demonstrate to the satisfaction of the Board of Supervisors that the violation has been corrected.

7-1.02K Labor Code**7-1.02K(1) General**

Work on the job site must comply with Labor Code §1720 et seq. and 8 CA Code of Regs § 16000 et seq. Work includes roadside production and processing of materials, and hauling and delivery of ready-mixed concrete.

Payroll records include time cards, canceled checks, cash receipts, trust fund forms, books, documents, schedules, forms, reports, receipts or other information which reflect job assignments, work schedules by days and hours, and the disbursement of payment to workers (8 CA Code of Regs § 16000).

7-1.02K(2) Wages

The Agency obtains the general prevailing rate of wages applicable to the work to be done. The rate includes:

1. Basic hourly rate
2. Employer payments for health and welfare, pension, vacation, apprenticeship training fees, travel time, and subsistence pay as provided for in Labor Code § 1773.1
3. Similar purposes

If the Notice to Bidders specifies that this Contract is in receipt of Federal Aid then federal minimum wage rates also apply. The federal minimum wage rates for this Contract as determined by the United States Secretary of Labor are available at <http://www.dot.ca.gov/hq/esc/oe/federal-wages>.

If the minimum wage rates as determined by the United States Secretary of Labor differs from the general prevailing wage rates determined by the Director of the California Department of Industrial Relations for similar classifications of labor, the Contractor and subcontractors must not pay less than the higher wage rate. The Department does not accept lower State wage rates not specifically included in the federal minimum wage determinations. This includes helper, or other classifications based on hours of experience, or any other classification not appearing in the federal wage determinations. Where federal wage determinations do not contain the State wage rate determination otherwise available for use by the Contractor and subcontractors, the Contractor and subcontractors must not pay less than the federal minimum wage rate that most closely approximates the duties of the employees in question.

The general prevailing wage rates and any applicable changes to these wage rates are available:

1. At the ACPWA Office of Contract Compliance, 951 Turner Court, Room 100, Hayward ~~At the Caltrans Labor Compliance Office of the district in which the work is located~~
2. From the Department of Industrial Relations' website

Post the general prevailing wage rates at a prominent place at the job site (Labor Code § 1773.2).

The wage determinations refer to expiration dates. The determinations with a single asterisk after the expiration date, and in effect on the date of advertisement for bids, are good for the life of the Contract. The determinations with double asterisks after the expiration date indicate the wage rate to be paid for work performed after this date has been determined. If work is to extend past this date, pay the new rate and incorporate it into the Contract. Changes in general prevailing wage determinations apply to the Contract when the Director of Industrial Relations has issued them at least 10 days before advertisement. (Labor Code § 1773.6 and 8 CA Code of Regs 16204)

The Agency does not recognize any claim for additional payment because of a payment by the Contractor of any wage rate in excess of the prevailing wage rate specified in the Contract.

The Contractor and any subcontractor must forfeit to the Agency not more than \$200 per day or part of a day for each worker paid less than the prevailing wage rate and pay the worker the difference between the prevailing wage rate and the rate paid (Labor Code § 1775). The Labor Commissioner determines the amount of this penalty and bases the amount on:

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1. Whether the failure to pay the correct prevailing wage rate was a good-faith mistake that the Contractor or subcontractor promptly and voluntarily corrected upon notice
2. Prior record of the Contractor or subcontractor in meeting its prevailing wage obligations
3. Contractor or subcontractor's willful failure to pay the correct rate of prevailing wages

If a worker employed by a subcontractor on a public works project is not paid the general prevailing per diem wages by the subcontractor, the Contractor is not liable for the penalties described in section 7-1.02K(2) unless the Contractor had knowledge of the failure to pay the correct general prevailing per diem wages or unless the Contractor fails to comply with the following requirements (Labor Code § 1775):

1. The contract executed between the Contractor and the subcontractor for the performance of work on the public works project must include a copy of the requirements in Labor Code §§ 1771, 1771.1, 1775, 1776, 1777.5, 1813, and 1815.
2. The Contractor must monitor the payment of the specified general prevailing rate of per diem wages by periodic review of the certified payroll records of the subcontractor.
3. Upon becoming aware of the subcontractor's failure to pay the specified prevailing rate of wages to the subcontractor's workers, the Contractor must diligently take corrective action to stop or rectify the failure, including withholding sufficient funds due the subcontractor for work performed on the public works project.
4. Before making final payment to the subcontractor for work performed on the public works project, the Contractor must obtain an affidavit signed under penalty of perjury from the subcontractor that the subcontractor has paid the specified general prevailing rate of per diem wages to its employees on the public works project and any amounts due under Labor Code § 1813.

Under Labor Code § 1775, the Agency must notify the contractor on a public works project within 15 days of receipt by the Agency of a complaint of the failure of a subcontractor on that public works project to pay workers the general prevailing rate of per diem wages.

7-1.02K(3) Certified Payroll Records (Labor Code § 1776)

This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations pursuant to Labor Code Section 1771.4. Certified payroll must be submitted to DIR.

Comply with section 3-1.10, "Contract and Labor Compliance Management."

Keep accurate payroll records.

~~Submit a copy of your certified payroll records, weekly, including those of subcontractors. Include:~~

- ~~1. Each employee's:~~
 - ~~1.1. Full name~~
 - ~~1.2. Address~~
 - ~~1.3. Social security number~~
 - ~~1.4. Work classification~~
 - ~~1.5. Straight time and overtime hours worked each day and week~~
 - ~~1.6. Actual wages paid for each day to each:~~
 - ~~1.6.1. Journeyman~~
 - ~~1.6.2. Apprentice~~
 - ~~1.6.3. Worker~~
 - ~~1.6.4. Other employee you employ for the work~~
 - ~~1.7. Pay rate~~
 - ~~1.8. Itemized deductions made~~
 - ~~1.9. Check number issued~~
- ~~2. Apprentices and the apprentice-to-journeyman ratio~~

~~Each certified payroll record must include a Statement of Compliance form signed under penalty of perjury that declares:~~

- ~~1. Information contained in the payroll record is true, correct, and complete~~

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- ~~2. Employer has complied with the requirements of sections 1771, 1811, and 1815 for any work performed by his or her employees on the public works project~~
- ~~3. Wage rates paid are at least those required by the Contract~~

~~The Agency allows the use of a form with identical wording as the Statement of Compliance form provided by the Agency.~~

~~Submitted certified payrolls for hauling and delivering ready mixed concrete must be accompanied by a written time record. The time record must include:~~

- ~~1. Truck driver's full name and address~~
- ~~2. Name and address of the factory or batching plant~~
- ~~3. Time the concrete was loaded at the factory or batching plant~~
- ~~4. Time the truck returned to the factory or batching plant~~
- ~~5. Truck driver's signature certifying under penalty of perjury that the information contained in this written time record is true and correct~~

~~You may submit certified payroll records electronically to the mailbox address that corresponds to the district in which the work is located. The districts' electronic mailbox addresses are as shown in the following table:~~

~~Before submitting the payroll records electronically, you must complete and sign the Contractor's Acknowledgement and submit it to the district's electronic mailbox address.~~

~~The Agency responds with an e-mail containing a Caltrans Internet Certificate to be used for the electronic submission of payroll records. When you accept the certificate and reply to the e-mail, the Agency is ready to accept your electronic submissions.~~

~~Each electronic submission must:~~

- ~~1. Include certified payroll records in a nonmodifiable PDF file. No spreadsheets, Microsoft Word documents, or password-protected documents are accepted.~~
- ~~2. Include a signed Statement of Compliance form with each weekly record.~~
- ~~3. Be received by the Agency by close of business on the 15th day of the month for the prior month's work.~~
- ~~4. Be encrypted before submission.~~
- ~~5. Contain the following information in the subject line:~~
 - ~~5.1. Contract number.~~
 - ~~5.2. Week ending date as W/E mm/dd/yy.~~
- ~~6. Contain 1 contract number and week ending date per submission.~~

For additional information on electronic submission of certified payroll records, go to the [Elations Systems website](#) ~~Department's Labor Compliance website.~~

Make certified payroll records available for inspection at all reasonable hours at your main office on the following basis:

1. Upon the employee's request or upon request of the employee's authorized representative, make available for inspection a certified copy of the employee's payroll record.
2. Refer the public's requests for certified payroll records to the Agency. Upon the public's request, the Agency makes available for inspection or furnishes copies of your certified payroll records. Do not give the public access to the records at your main office.

Make all payroll records, including employee's complete social security number, available for inspection and copying or furnish a copy upon request of a representative of the:

1. Agency
2. Division of Labor Standards Enforcement of the Department of Industrial Relations
3. Division of Apprenticeship Standards of the Department of Industrial Relations

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Furnish the Agency the location of the records. Include the street address, city, and county. Furnish the Agency a notification of a location and address change within 5 business days of the change.

Comply with a request for the records within 10 days after you receive a written request. If you do not comply within this period, the Agency withholds from progress payments a \$100 penalty for each day or part of a day for each worker until you comply. You are not assessed this penalty for a subcontractor's failure to comply with Labor Code § 1776.

~~Caltrans withholds from progress payments for delinquent or inadequate records (Labor Code § 1771.5). If you have not submitted an adequate record by the month's 15th day for the period ending on or before the 1st of that month, Caltrans withholds up to 10 percent of the monthly progress estimate, exclusive of mobilization. Caltrans does not withhold more than \$10,000 or less than \$1,000.~~

7-1.02K(4) Apprentices

The responsibility of compliance with Labor Code Section 1777.5 is with the prime contractor.

Comply with the apprentice to journeyman ratio requirements (Labor Code § 1777.5(g)).

Comply with the training contribution requirements (Labor Code § 1777.5(m)(1)).

For answers to questions, contact the Division of Apprenticeship Standards before starting work.

~~Caltrans deducts from progress payments civil penalties assessed by the Chief of the Division of Apprenticeship Standards for violating Labor Code § 1777.5 (Labor Code § 1777.7).~~

7-1.02K(5) Working Hours

Eight hours is a legal day's work (Labor Code § 1810).

The time of service of any worker employed on public work is limited and restricted to 8 hours in 1 day and 40 hours in 1 calendar week, except as provided by Labor Code § 1815 (Labor Code § 1811).

A Contractor's employee may work more than 8 hours per day and 40 hours per week if the Contractor pays the employee 1-1/2 times the basic pay rate for the hours worked in excess of 8 hours per day and 40 hours per week (Labor Code § 1815).

For each worker employed in the work for each day the worker works more than 8 hours in 1 day and 40 hours in 1 calendar week without overtime pay, the Agency deducts \$25 as a penalty for violating Labor Code § 1815 (Labor Code § 1813).

7-1.02K(6) Occupational Safety and Health Standards

7-1.02K(6)(a) General

Comply with applicable occupational safety and health standards, rules, regulations, and orders. The Occupational Safety and Health Standards Board is the only agency authorized in the State to adopt and enforce occupational safety and health standards (Labor Code § 142 et seq.).

You must contact the local public health service Agency for information concerning public health conditions within the area of the project.

You are the controlling employer and must ensure hazardous conditions are corrected (Labor Code § 6400).

Make arrangements for and maintain in a sanitary manner all necessary sanitary conveniences at the job site for the workers, in accordance with Group 2, Article 9 of the General Industry Safety Orders.

The Engineer may notify Cal/OSHA if you fail to establish or maintain a safe and healthful workplace.

Submit copies of your Injury and Illness Prevention Program, Code of Safe Practices, and permits required by Cal/OSHA as informational submittals.

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The program must address the use of personal and company-issued electronic devices during work. Do not allow the use of entertainment and personal communication devices in the work zone. Workers may use a communication device for business purposes in the work area, at a location where their safety and the safety of other workers and the ~~traveling~~ public is not compromised.

The Agency is not responsible for the health and safety of:

1. Contractor's personnel
2. Subcontractor's personnel
3. Supplier's personnel
4. Any other persons present at the job site at the request of you or your subcontractors.

7-1.02K(6)(b) Excavation Safety

Comply with Labor Code § 6705 while excavating. For an excavation 5 feet or more in depth, submit shop drawings for a protective system.

The drawings must show the design and details for providing worker protection from caving ground during excavation.

Shop drawings of protective systems for which the Construction Safety Orders require design by a registered professional engineer must be sealed and signed by an engineer who is registered as a civil engineer in the State.

The submittal must allow review time and include the contents shown in the following table except the review time is 65 days for an excavation on or affecting railroad property:

Drawing Review Time and Contents

Topic	Plan not requiring a signature	Plan requiring a signature
Review time	5 business days before excavating	20 days before excavating
Contents	Drawings Calculations Material information Proprietary system information	Drawings Calculations Material information Proprietary system information Soil classification Soil properties Soil design calculations

Conduct a safety conference prior to the initiation of any actual work or operations under a permit issued by the Division of Industrial Safety. Such a safety conference must include your representatives and that of the employer and employees as well as those of the Engineer. The safety conference must include a discussion of the Employer's Safety Program and such means, methods, devices, processes, practices, conditions and operations intended to be used for facilitating safe employment.

Nothing in these requirements shall be deemed to allow the use of shoring, sloping or protective systems less effective than that required by the Construction Safety Orders.

Nothing in these requirements shall be construed to impose tort liability on the Agency or any of its employees.

7-1.02K(6)(c) Tunnel Safety

Reserved

7-1.02K(6)(d) Confined Space Safety

Comply with 8 CA Code of Regs § 5158 while working in a confined space.

7-1.02K(6)(e) Scaffolding

Reserved

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7-1.02K(6)(f)–7-1.02K(6)(i) Reserved

7-1.02K(6)(j) Lead Safety

7-1.02K(6)(j)(i) General

Reserved

7-1.02K(6)(j)(ii) Lead Compliance Plan

Section 7-1.02K(6)(j)(ii) applies if a bid item for a lead compliance plan is shown on the Bid Item List.

Regulations containing specific Cal/OSHA requirements when working with lead include 8 CA Code of Regs § 1532.1.

Submit a plan:

1. That documents your compliance program to prevent or minimize worker exposure to lead
2. Including the items listed in 8 CA Code of Regs § 1532.1(e)(2)(B)
3. Sealed and signed by a CIH with knowledge of and experience complying with 8 CA Code of Regs

Allow 7 days for review. Obtain authorization for the plan before starting any activity that presents the potential for lead exposure.

Before starting any activity that presents the potential for lead exposure to employees who have no prior training, including State employees, provide a safety training program to these employees that complies with 8 CA Code of Regs § 1532.1 and your lead compliance plan.

Submit copies of air monitoring or job site inspection reports made by or under the direction of the CIH under 8 CA Code of Regs § 1532.1 within 10 days after the date of monitoring or inspection.

Supply personal protective equipment, training, and washing facilities required by your lead compliance plan for 5 Agency employees.

7-1.02K(6)(j)(iii) Unregulated Earth Material Containing Lead

Reserved

7-1.02K(6)(j)(iv–viii) Reserved

7-1.02K(6)(k)–7-1.02K(6)(t) Reserved

7-1.02L Public Contract Code

7-1.02L(1) General

Under the Pub Cont Code, a debarred or ineligible subcontractor is prohibited from working on this project.

You will not be paid for work performed by a debarred or ineligible subcontractor; however, you are responsible for paying the wages of its workers that were allowed to work on the project.

Any Agency funds paid to you for work performed by a debarred or ineligible subcontractor must be returned to the Agency.

7-1.02L(2) Antitrust Claims

In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, the contractor or subcontractor offers and agrees to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with § 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to the contractor, without further acknowledgment by the parties. [Pub Cont Code § 7103.5 (b)]

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7-1.02M Public Resources Code

7-1.02M(1) General

Reserved

7-1.02M(2) Fire Protection

Submit the names and emergency telephone numbers of the nearest fire suppression agencies before the start of job site activities as an informational submittal. Post the names and phone numbers at a prominent place at the job site.

Submit a copy of your fire prevention plan required by Cal/OSHA as an informational submittal before the start of job site activities.

Cooperate with fire prevention authorities in performance of the work.

Immediately report fires occurring within and near the project limits by dialing 911 and to the nearest fire suppression agency by using the emergency phone numbers retained at the job site.

Prevent project personnel from setting open fires that are not part of the work.

Prevent the escape of and extinguish fires caused directly or indirectly by job site activities.

7-1.02M(3) Surface Mining and Reclamation Act

Imported borrow or aggregate material must come from a surface mine permitted under the Surface Mining and Reclamation Act of 1975, Pub Res Code § 2710 et seq., or from a source not subject to this act.

For the list of permitted sites, go to the Department of Conservation, Division of Mine Reclamation website.

If you import borrow or aggregate material from a surface mine not on this list, submit proof that the source is not subject to this act.

7-1.02M(4)–7-1.02M(7) Reserved

7-1.02N Reserved

7-1.02O Vehicle Code

Under Veh Code § 591, the Agency determines areas within the project limits are open to public traffic. For those areas, comply with the requirements set forth in Divisions 11, 12, 13, 14 and 15 of the Veh Code.

Veh Code § 591 does not relieve you or any other person from the duty of exercising due care.

7-1.02P–7-1.02Z Reserved

7-1.03 PUBLIC CONVENIENCE

Compliance with section 7-1.03 does not relieve you of your responsibility for public safety.

Construction activities must ~~not limit~~ inconvenience to the public ~~or~~ and abutting property owners. Schedule and conduct work to avoid unnecessary inconvenience to the public and abutting property owners. Avoid undue delay in construction activities to reduce the public's exposure to construction.

Work cooperatively with administrators of local schools to schedule work in a manner that avoids conflict with school operations, especially access and testing.

Notify residents of unavoidable inconveniences. Use templates provided in Information Handout D.

Where possible, route traffic on new or existing paved surfaces.

Maintain convenient access to driveways, houses, and buildings. When an abutting property owner's access across the right-of-way line is to be eliminated or replaced under the Contract, the existing access

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must not be closed until the replacement access facility is usable. Construct temporary approaches to a crossing and an intersecting highway.

Provide a reasonably smooth and even surface for use by traffic at all time during the excavation of a roadway and construction of an embankment. Before other grading activities, place fill at culverts and bridges to allow traffic to cross. If ordered, excavate a roadway cut in layers and construct an embankment in partial widths at a time alternating construction from one side to the other and routing traffic over the side opposite the one under construction. Install or construct culverts on only 1/2 the width of the traveled way at a time; keep the traveled way portion being used by traffic open and unobstructed until the opposite side of the traveled way is ready for use by traffic.

Upon completion of rough grading or placing any subsequent layer, bring the surface of the roadbed to a smooth and even condition, free of humps and depressions, and satisfactory for the use of the public.

After subgrade preparation for a specified layer of material has been completed, repair any damage to the roadbed or completed subgrade, including damage caused by public use.

While subgrade and paving activities are underway, allow the public to use the shoulders. If half-width paving methods are used, allow the public to use the side of the roadbed opposite the one under construction. If enough width is available, keep open a passageway wide enough to accommodate at least 2 lanes of traffic at locations where subgrade and paving activities are underway. Shape shoulders or reshape subgrade as necessary to accommodate traffic during subgrade preparation and paving activities.

Apply a dust palliative for the prevention or alleviation of dust nuisance.

If a height differential of more than 0.04 foot is created by construction activities at a joint transverse to the direction of traffic on the traveled way or a shoulder subject to public traffic, construct a temporary taper at the joint with a slope complying with the requirements shown in the following table:

Temporary Tapers

Height differential (foot)	Slope (horizontal:vertical)	
	Taper use of 14 days or less	Taper use of more than 14 days
Greater than 0.08	100:1 or flatter	200:1 or flatter
0.04–0.08	70:1 or flatter	70:1 or flatter

For a taper on existing asphalt concrete or concrete pavement, construct the taper with minor HMA under section 39-2.07.

Grind existing surfaces to accommodate a minimum taper thickness of 0.10 foot under either of the following conditions:

1. HMA material such as rubberized HMA, polymer-modified bonded wearing course, or open-graded friction course is unsuitable for raking to a maximum 0.02 foot thickness at the edge
2. Taper will be in place for more than 14 days

For a taper on a bridge deck or approach slab, construct the taper with rapid setting concrete under section 60-3.02B(2) or polyester concrete under section 60-3.04B(2). Prepare the surface to receive the taper under section 60-3.02C(7). For tapers with aggregate fillers, rake conform edges to ensure smooth transitions. Cure the taper for at least 3 hours or the minimum time recommended by the manufacturer before opening to traffic.

The completed surface of the taper must be uniform and must not vary more than 0.02 foot from the lower edge of a 12-foot straightedge when placed on its surface parallel and perpendicular to traffic.

If authorized, you may use alternative materials or methods to construct the required taper.

Install signs, lights, flares, Type K temporary railing, barricades and other facilities to direct traffic. Provide flaggers whenever necessary to direct the movement of the public through or around the work. Flagging must comply with section 12-1. ~~Caltrans pays you for this work under section 12-1.04.~~

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You are required to pay for the cost of replacing or repairing all facilities installed under change order work for the convenience, direction, or warning of the public that are lost while in your custody or are damaged by your operations to such an extent as to require replacement or repair.

The Engineer may order or consent to your request to open a completed section of surfacing, pavement, or structure roadway surface for public use. You will not be compensated for any delay to your construction activities caused by the public. This does not relieve you from any other contractual responsibility.

7-1.04 PUBLIC SAFETY

You are responsible to provide for public safety.

Do not construct a temporary facility that interferes with the safe passage of traffic.

Control dust resulting from the work, inside and outside the right-of-way.

Move workers, equipment, and materials without endangering traffic.

Whenever your activities create a condition hazardous to the public, furnish, erect and maintain those fences, temporary railing, barricades, lights, signs, and other devices and take any other necessary protective measures to prevent damage or injury to the public.

Any fences, temporary railing, barricades, lights, signs, or other devices furnished, erected and maintained by you are in addition to those for which payment is provided elsewhere in the specifications.

Provide flaggers whenever necessary to ensure that the public is given safe guidance through the work zone. Flagging must comply with section 12-1. ~~Caltrans pays you for this work under section 12-1.04.~~

At locations where traffic is being routed through construction under one-way controls, move your equipment in compliance with the one-way controls unless otherwise ordered.

Use of signs, lights, flags, or other protective devices must comply with the *California MUTCD* and any directions of the Engineer. Signs, lights, flags or other protective devices must not obscure the visibility of, nor conflict in intent, meaning, and function of either existing signs, lights and traffic control devices, or any construction area signs.

Keep existing traffic signals and highway lighting in operation. Other forces within the Agency will perform routine maintenance of these facilities during the work.

Cover signs that direct traffic to a closed area. ~~Except for work specified in section 12, maintaining, and removing the covers on construction area signs is change order work.~~ Cover, maintain, and remove the covers on construction area signs as part of temporary traffic control under section 12.

Install temporary illumination such that the illumination and the illumination equipment do not interfere with public safety. The installation of general roadway illumination does not relieve you from furnishing and maintaining any protective devices.

Equipment must enter and leave the highway via existing ramps and crossovers and must move in the direction of traffic. All movements of workers and construction equipment on or across lanes open to traffic must be performed in a manner that do not endanger the public. Your vehicles or other mobile equipment leaving an open traffic lane to enter the construction area must slow down gradually in advance of the location of the turnoff to give the traffic following an opportunity to slow down. When leaving a work area and entering a roadway carrying traffic, your vehicles and equipment must yield to traffic. Compensation for flaggers, used for all movement of workers and construction vehicles and equipment on or across lanes open to traffic, is included in the bid items of work involved.

Immediately remove hauling spillage from a roadway lane or shoulder open to traffic. When hauling on roadways, trim loads and remove material from shelf areas to minimize spillage.

Notify the Engineer not less than 25 days and not more than 125 days before the anticipated start of an activity that will change the vertical or horizontal clearance available to traffic, including shoulders.

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If vertical clearance is temporarily reduced to 15.5 feet or less, place low clearance warning signs in compliance with the *California MUTCD* and any directions of the Engineer. Signs must comply with the dimensions, color, and legend requirements of the *California MUTCD* and section 12-3.11 except that the signs must have black letters and numbers on an orange retroreflective background. W12-2P signs must be illuminated so that the signs are clearly visible.

Pave or provide full width continuous and cleared wood walks for pedestrian openings through falsework. Protect pedestrians from falling objects and concrete-curing water. Extend overhead protection for pedestrians at least 4 feet beyond the edge of the bridge deck. Illuminate all pedestrian openings through falsework. Temporary pedestrian facilities must comply with the *California MUTCD*, Part 6, Chapter 6D, "Pedestrian and Worker Safety."

Do not store vehicles, material, or equipment in a way that:

1. Creates a hazard to the public
2. Obstructs traffic control devices

Do not install or place temporary facilities used to perform the work which interfere with the free and safe passage of traffic.

Temporary facilities that could be a hazard to public safety if improperly designed must comply with design requirements described in the Contract for those facilities or, if none are described, with standard design criteria or codes appropriate for the facility involved. Submit shop drawings and design calculations for the temporary facilities and show the standard design criteria or codes used. Shop drawings and supplemental calculations must be sealed and signed by an engineer who is registered as a civil engineer in the State.

If you appear to be neglectful or negligent in furnishing warning devices, an adequate traffic control system, adequate temporary pavement delineation, and taking proper protective measures, or meeting the minimum standards specified in the current California MUTCD, the Engineer may direct your attention to the existence of a hazard. You must immediately implement corrective measures to mitigate the hazard. ~~You must furnish and install the necessary warning devices.~~ If the Engineer points out the inadequacy of warning devices and protective measures, that action on the part of the Engineer does not relieve you from your responsibility for public safety or abrogate your obligation to furnish and pay for these devices and measures.

If you fail to implement corrective measures within the time frame given by the Engineer or within 24 hours after having been so directed, whichever is less, the Agency will have the right to do the corrective work in the interest of maintaining public safety. You will then be responsible for maintaining corrective measures installed by the Agency forces. The costs associated with the Agency's corrective work will be deducted from any monies due to you now or in the future. You will have no rights to claim for the monies deducted from the Contract for such cause and for the Agency's taking over of the necessary work to maintain public safety.

Install Type K temporary railing or other authorized protective systems under any of the following conditions:

1. Excavations: Where the near edge of the excavation is within 15 feet from the edge of an open traffic lane
2. Temporarily unprotected permanent obstacles: When the work includes the installation of a fixed obstacle together with a protective system, such as a sign structure together with protective railing, and you elect to install the obstacle before installing the protective system; or you, for your convenience and as authorized, remove a portion of an existing protective railing at an obstacle and do not replace such railing completely the same day
3. Storage areas: When material or equipment is stored within 15 feet of the edge of an open traffic lane and the storage is not otherwise prohibited by the Contract
4. Height differentials: When construction operations create a height differential greater than 0.15 feet within 15 feet of the edge of traffic lane

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Installation of Type K temporary railing is not required if an excavation within 15 feet from the edge of an open traffic lane is protected by any of the following:

1. Steel plate or concrete covers of adequate thickness to prevent accidental entry by traffic or the public
2. Side slope where the downhill slope is 4:1 (horizontal:vertical) or less unless a naturally occurring condition
3. Barrier or railing

Offset the approach end of Type K temporary railing a minimum of 15 feet from the edge of an open traffic lane. Install the temporary railing on a skew toward the edge of the traffic lane of not more than 1 foot transversely to 10 feet longitudinally with respect to the edge of the traffic lane. If the 15-foot minimum offset cannot be achieved, the temporary railing must be installed on the 10 to 1 skew to obtain the maximum available offset between the approach end of the railing and the edge of the traffic lane, and an array of temporary crash cushion modules must be installed at the approach end of the temporary railing.

Secure Type K temporary railing in place before starting work for which the temporary railing is required.

If a traffic lane is closed with channelizers for excavation work, move the devices to the adjacent edge of the traveled way when not excavating. Space the devices as specified for the closure.

Do not move or temporarily suspend anything over a traffic lane open to the public unless the public is protected.

7-1.05 INDEMNIFICATION

7-1.05A General

To the fullest extent allowed by law (including, without limitation, California Civil Code Section 2782), you must defend, indemnify, and save harmless the entity which awards the Contract, be it the County of Alameda or the Alameda County Flood Control and Water Conservation District, including its Board of Supervisors, officers, employees, and agents (excluding agents who are design professionals), from any and all claims, demands, causes of action, damages, costs, expenses, actual attorneys' fees, losses or liabilities, in law or in equity (Section 7-1.05 Claims) arising out of or in connection with your performance of this Contract including those for:

1. Bodily injury including, but not limited to, bodily injury, sickness or disease, emotional injury or death to persons, including, but not limited to, the public, any employees or agents of you, the Agency, or any other contractor; and
2. Damage to property of anyone including loss of use thereof; caused or alleged to be caused in whole or in part by any negligent or otherwise legally actionable act or omission of you or anyone directly or indirectly employed by you or anyone for whose acts you may be liable.
3. Charges which may arise for all liability on account of any patent rights, copyrights, or trade names which may affect the articles or materials used in the construction of the work, or their application under the specifications.

Except as otherwise provided by law, these requirements apply regardless of the existence or degree of fault of the Agency. ~~You are not obligated to indemnify the State for Claims arising from conduct delineated in Civ Code § 2782 and for Claims arising from any defective or substandard condition of the highway that existed at or before the start of work, unless this condition has been changed by the work or the scope of the work requires you to maintain existing highway facilities and the Claim arises from your failure to maintain.~~ Your defense and indemnity obligation shall extend to Claims arising after the work is completed and accepted if the Claims are directly related to alleged acts or omissions by you that occurred during the course of the work. Any inspection of the work by the Agency is not a waiver of full compliance with these requirements.

Your obligation to defend and indemnify is not excused because of your inability to evaluate liability or because you evaluate liability and determine that you are not liable. You must respond within 30 days to the tender of any Claim for defense and indemnity by the Agency, unless this time has been extended by the Agency. If you fail to accept or reject a tender of defense and indemnity within 30 days, in addition to

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any other remedy authorized by law, the Agency may withhold such funds the Agency reasonably considers necessary for its defense and indemnity until disposition has been made of the Claim or until the Contractor accepts or rejects the tender of defense, whichever occurs first.

With respect to third-party claims against you, you waive all rights of any type to express or implied indemnity against the County or District, its officers, employees, or agents (excluding agents who are design professionals).

Nothing in the Contract is intended to establish a standard of care owed to any member of the public or to extend to the public the status of a third-party beneficiary for any of these indemnification specifications.

7-1.05B Responsibility to Other Entities

You are responsible for any liability imposed by law and for injuries to or death of any person, including workers and the public, or damage to property. Indemnify and save harmless the State, any county, city or district and its officers and employees connected with the work, within the limits of which county, city, or district the work is being performed, all in the same manner and to the same extent specified for the protection of the County or District.

7-1.05C Other

You are responsible to the fullest extent allowed by law, to defend and indemnify the County/District for any and all injury, illness, disease, or death arising out of or caused by an organism, including but not limited to animals, microscopic bacteria, fungi, plants and the like, to which persons, including but not limited to the public, any employees or agents of yours, the Agency, or any other contractors that are exposed in connection with the work on the project.

7-1.06 INSURANCE

7-1.06A General

Nothing in the Contract is intended to establish a standard of care owed to any member of the public or to extend to the public the status of a third-party beneficiary for any of these insurance specifications.

7-1.06B Casualty Insurance

Obtain and maintain insurance on all of your operations with companies acceptable to the Agency as follows:

1. Keep all insurance in full force and effect from the start of the work through Contract acceptance.
2. All insurance must be with an insurance company with a rating from A.M. Best Financial Strength Rating of A- or better and a Financial Size Category of VII or better.
3. Maintain completed operations coverage with a carrier acceptable to the Agency through the expiration of the patent deficiency in construction statute of repose set forth in Civ Pro Code § 337.1.

7-1.06C Workers' Compensation and Employer's Liability Insurance

Under Labor Code § 1860, secure the payment of worker's compensation under Labor Code § 3700.

Submit to the Agency the following certification before performing the work (Labor Code § 1861):

I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract.

Contract signing constitutes your submittal of this certification.

Provide Employer's Liability Insurance in amounts not less than:

1. \$1,000,000 for each accident for bodily injury by accident
2. \$1,000,000 policy limit for bodily injury by disease
3. \$1,000,000 for each employee for bodily injury by disease

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If there is an exposure of injury to your employees under the US Longshoremen's and Harbor Workers' Compensation Act, the Jones Act, or under laws, regulations, or statutes applicable to maritime employees, coverage must be included for such injuries or claims.

7-1.06D Liability Insurance

7-1.06D(1) General

Carry General Liability and Umbrella or Excess Liability Insurance covering all operations by or on behalf of you providing insurance for bodily injury liability and property damage liability for the following limits and including coverage for:

1. Premises, operations and mobile equipment
2. Products and completed operations
3. Broad form property damage (including completed operations)
4. Explosion, collapse, and underground hazards
5. Personal injury
6. Contractual liability

7-1.06D(2) Liability Limits/Additional Insureds

The limits of liability must be at least the values shown in the following table:

Liability Limits				
Total bid	For each occurrence ^a	Aggregate for products/completed operation	General aggregate ^b	Umbrella or excess liability ^c
≤ \$1,000,000	\$1,000,000	\$2,000,000	\$2,000,000	\$5,000,000
> \$1,000,000 ≤ \$10,000,000	\$1,000,000	\$2,000,000	\$2,000,000	\$10,000,000
> \$10,000,000 ≤ \$25,000,000	\$2,000,000	\$2,000,000	\$4,000,000	\$15,000,000
> \$25,000,000	\$2,000,000	\$2,000,000	\$4,000,000	\$25,000,000

^aCombined single limit for bodily injury and property damage.

^bThis limit must apply separately to your work under this Contract.

^cThe umbrella or excess policy must contain a clause stating that it takes effect (drops down) in the event the primary limits are impaired or exhausted.

Do not require a small business subcontractor to carry liability insurance that exceeds the limits shown in the preceding table. For a small business subcontractor, interpret *Total Bid* in the table as the dollar amount of subcontracted work.

As used in section 7-1.06D(2), a small business:

1. For a non-federal-aid contract is defined in 2 CA Code of Regs § 1896 and is incorporated by this reference
2. For a federal-aid contract is defined in 13 CFR 121.201 and is incorporated by this reference

Every policy must contain a cross liability or severability of interests clause.

The entity which awards the Contract, be it the County or District, including its officers, directors, agents (excluding agents who are design professionals), and employees, must be named as additional insureds under the General Liability and Umbrella Liability Policies with respect to liability arising out of or connected with work or operations performed by or on behalf of you under this Contract. Coverage for such additional insureds does not extend to liability:

1. Arising from any defective or substandard condition of the roadway which existed at or before the time you started work, unless such condition has been changed by the work or the scope of the work requires you to maintain existing roadway facilities and the claim arises from your failure to maintain;
2. For claims occurring after the work is completed and accepted unless these claims are directly related to alleged acts or omissions of you that occurred during the course of the work; or
3. To the extent prohibited by Ins Code § 11580.04.

Additional insured coverage must be provided by a policy provision or by an endorsement providing coverage at least as broad as ISO Form CG 20 10 11 85 or if not available, through the addition of both CG 20 10, CG 20 26, CG 20 33, and CG 20 37 if a later version is used ~~Additional Insured (Form B) endorsement form CG 2010, as published by the Insurance Services Office (ISO), or other form designated by the Agency.~~

7-1.06D(3) Contractor's Insurance Policy is Primary

The policy must stipulate that the insurance afforded the additional insureds applies as primary insurance. Any other insurance or self-insurance maintained by the County/District is excess only and must not be called upon to contribute with this insurance.

7-1.06E Automobile Liability Insurance

Carry automobile liability insurance, including coverage for all owned, hired, and nonowned automobiles. The primary limits of liability must be not less than \$1,000,000 combined single limit for each accident for bodily injury and property damage. The umbrella or excess liability coverage required under section 7-1.06D(2) also applies to automobile liability.

7-1.06F Policy Forms, Endorsements, and Certificates

Provide your General Liability Insurance under Commercial General Liability policy form no. CG0001 as published by the Insurance Services Office (ISO) or under a policy form at least as broad as policy form no. CG0001.

7-1.06G Deductibles

Any deductible provision must not exceed \$5,000 per claim for projects valued up to \$500,000 and \$25,000 per claim for projects valued over \$500,000.

~~The State may expressly allow deductible clauses, which it does not consider excessive, overly broad, or harmful to the interests of the State.~~ Regardless of the allowance of exclusions or deductions by the Agency, you are responsible for any deductible amount and must warrant that the coverage provided to the Agency complies with section 7-1.06.

7-1.06H Enforcement

The Agency may assure your compliance with your insurance obligations. Ten days before an insurance policy lapses or is canceled during the Contract period you must submit to the Agency evidence of renewal or replacement of the policy.

If you fail to maintain any required insurance coverage, the Agency may maintain this coverage and withhold or charge the expense to you or terminate your control of the work.

You are not relieved of your duties and responsibilities to indemnify, defend, and hold harmless the County/District, its officers, agents, and employees by the Agency's acceptance of insurance policies and certificates.

The minimum insurance coverage amounts do not relieve you for liability in excess of such coverage, nor do they preclude the Agency from taking other actions available to it, including the withholding of funds under this Contract.

7-1.06I Self-Insurance

Self-insurance programs and self-insured retentions in insurance policies are subject to separate annual review and approval by the Agency.

If you use a self-insurance program or self-insured retention, you must provide the County/District with the same protection from liability and defense of suits as would be afforded by first-dollar insurance. Execution of the Contract is your acknowledgment that you will be bound by all laws as if you were an insurer as defined under Ins Code § 23 and that the self-insurance program or self-insured retention shall operate as insurance as defined under Ins Code § 22. The policy language shall allow or be endorsed to provide, that the self-insured retention may be satisfied by either the named insured or the County/District.

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7-1.07 LEGAL ACTIONS AGAINST THE COUNTY/DISTRICT

7-1.07A General

If legal action is brought against the County/District over compliance with a State or federal law, rule, or regulation applicable to highway work, ~~then~~ and:

1. If the Agency in complying with a court order prohibits you from performing work, then the resulting delay is a suspension related to your performance, unless the Agency terminates the Contract.
2. If a court order other than an order to show cause or the final judgment in the action prohibits the Agency from requiring you to perform work, the Agency may delete the prohibited work or terminate the Contract.

7-1.07B Seal Coat Claims

Not Used

7-1.08 PERSONAL LIABILITY

Neither the Director, the Engineer nor any other officer or authorized employee of Agency or County/District, nor any officer or employee of the State, any county, city or district shall be personally responsible for any liability arising under or by virtue of the Contract.

7-1.09–7-1.10 RESERVED

7-1.11 FEDERAL LAWS FOR FEDERAL-AID CONTRACTS

Not Used

8 PROSECUTION AND PROGRESS

8-1.01 GENERAL

Section 8 includes specifications related to prosecuting the Contract and work progress.

8-1.02 SCHEDULE

8-1.02A General

Upon completion of all work, the Agency returns the withholds associated with section 8-1.02 and makes a payment adjustment for work not performed in the same manner as work-character changes.

8-1.02B Level 1 Critical Path Method Schedule

8-1.02B(1) General

Section 8-1.02B applies to a contract with a total bid less than \$1 million and less than 100 original working days.

Before or at the preconstruction conference, submit a CPM baseline schedule.

For each schedule, submit:

1. Plotted original, time-scaled network diagram on a sheet at least 8-1/2 by 11 inches with a title block and timeline
2. Read-only compact disc or other Engineer-authorized data-storage device containing the schedule data if software is used to make the schedule. Label the device with:
 - 2.1. Contract number
 - 2.2. CPM schedule number and date produced
 - 2.3. File name

8-1.02B(2) Schedule Format

On each schedule, show:

1. Planned and actual start and completion dates of each work activity, including applicable:
 - 1.1. Submittal development
 - 1.2. Submittal review and acceptance
 - 1.3. Material procurement
 - 1.4. Contract milestones and constraints
 - 1.5. Equipment and plant setup
 - 1.6. Interfaces with outside entities
 - 1.7. Erection and removal of falsework and shoring
 - 1.8. Test periods
 - 1.9. Major traffic stage change
 - 1.10. Final cleanup
2. Order that you propose to prosecute the work
3. Logical links between the time-scaled work activities
4. All controlling activities
5. Legible description of each activity
6. At least 1 predecessor and 1 successor to each activity except for project start and project end milestones
7. Duration of at least 1 working day for each activity
8. Start milestone date as the Contract approval date

8-1.02B(3) Updated Schedule

Submit a monthly updated schedule that includes the status of work completed to date and the work yet to be performed as planned.

You may include changes to updated schedules that do not alter a critical path or extend the scheduled completion date compared to the current schedule. Changes may include:

1. Adding or deleting activities
2. Changing activity constraints

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3. Changing durations
4. Changing logic

If any proposed change in planned work would alter the critical path or extend the scheduled completion date, submit a revised schedule within 15 days of the proposed change.

8-1.02C Level 2 Critical Path Method Schedule

Not Used

8-1.02D Level 3 Critical Path Method Schedule

Not Used

8-1.02E–8-1.02F Reserved

8-1.03 PRECONSTRUCTION CONFERENCE

Attend a preconstruction conference with key personnel, including your assigned representative, at a time and location determined by the Engineer. Submit documents as required before the preconstruction conference. ~~You may start work before the preconstruction conference.~~

Be prepared to discuss the topics and documents shown in the following table:

Topic	Document
Potential claim and dispute resolution	Potential claim forms
Contractor's representation	Assignment of Contractor's representative
DBE and DVBE	Final utilization reports
Equipment	Equipment list
Labor compliance and equal employment opportunity	Job site posters and benefit and payroll reports
Material inspection	Notice of Materials to be Used form
Materials on hand	Request for Payment for Materials on Hand form
Measurements	--
Partnering	--
Quality control	QC plans
Safety	Injury and Illness Prevention Program, Code of Safe Practices, and job site posters
Schedule	Baseline schedule and Weekly Statement of Working Days form
Subcontracting	Subcontracting Request form
Surveying	Survey Request form
Traffic control	Traffic contingency plan and traffic control plans
Utility work	--
Weight limitations	--
Water pollution control	SWPPP or WPCP
Work restrictions	PLACs
Action submittals	--

8-1.04 START OF JOB SITE ACTIVITIES

8-1.04A General

Reserved

8-1.04B Standard Start

After Contract approval the Agency will issue a limited notice to proceed authorizing survey work when the Bid Item List includes an item for survey monument preservation. Upon request, the Engineer may also authorize you to simultaneously prospect for underground utilities. A count of working days will commence with your start of authorized work and will continue until the Agency receives the entirety of your preconstruction corner records submittal. During this time, restrict your job site activities to the work authorized.

After the County Surveyor's approval of your preconstruction records, an unrestricted notice to proceed with construction work will be issued.

~~Begin work within 10 days after the issuance of a Notice to Proceed. A count of working days will begin (or resume) upon your start of job site activities.~~

~~For a project that does not require a SWPPP, start job site activities within 15 days after receiving notice that the Contract has been approved by the Attorney General or the attorney appointed and authorized to represent the Caltrans.~~

~~For a project that requires a SWPPP, start job site activities within 55 days after receiving notice that the Contract has been approved by the Attorney General or the attorney appointed and authorized to represent the Caltrans.~~

Submit a notice 72 hours before starting job site activities. If the project has more than 1 work location, submit a separate notice for each location.

~~You may start job site activities before receiving notice of Contract approval if you:~~

- ~~1. Deliver the signed Contract, bonds, and evidence of insurance to the Agency~~
- ~~2. Submit a 72 hour notice~~
- ~~3. Obtain an encroachment permit from the Agency~~
- ~~4. Receive the Agency's authorization to start~~
- ~~5. Perform work at your own risk~~
- ~~6. Perform work under the Contract~~

~~If the Contract is approved, work already performed that complies with the Contract is authorized.~~

~~If the Contract is not approved, leave the job site in a neat condition. If a facility has been changed, restore it to its former condition or an equivalent condition. The Agency does not pay for the restoration.~~

~~The Agency does not adjust time for work performed before Contract approval.~~

8-1.04C Delayed Start

Reserved

8-1.04D Early Return-Early Start

Reserved

8-1.04E Next-Day Start

Reserved

8-1.04F Flexible Start

Reserved

8-1.04G Potential Budget Impasse Start

Reserved

8-1.04H-8-1.04J Reserved

8-1.05 TIME

The number of allotted Working Days is: 50.

~~The contract time starts on the earlier of the following:~~

- ~~1. Day you start job site activities after Contract approval~~
- ~~2. Last day specified to start job site activities in section 8-1.04~~

Complete the work within the Contract time.

Meet each specified interim work-completion date.

The Engineer issues a Weekly Statement of Working Days form by the end of the following week.

The Weekly Statement of Working Days form shows:

1. Working days and non-working days during the reporting week
2. Time adjustments
3. Calculations of work completion dates, including working days remaining
4. Controlling activities

8-1.06 SUSPENSIONS

8-1.06A General

The Engineer may suspend work wholly or in part due to conditions unsuitable for work progress. Provide for public safety and a smooth and unobstructed passageway through the work zone during the suspension as specified in sections 7-1.03 and 7-1.04. Providing the passageway is force account work. The Agency makes a time adjustment for the suspension due to a critical delay.

The Engineer may suspend work wholly or in part due to your failure to (1) fulfill the Engineer's orders, (2) fulfill a Contract part, or (3) perform weather-dependent work when conditions are favorable so that weather-related unsuitable conditions are avoided or do not occur. The Agency may provide for a smooth and unobstructed passageway through the work during the suspension and deduct the cost from payments. The Agency does not make a time adjustment for the suspension.

Upon the Engineer's order of suspension, suspend work immediately. Resume work when ordered.

8-1.06B Title 23 Code of Federal Regulations § 635.109

Section 8-1.06B applies to a federal aid contract

If the performance of all or any portion of work is suspended or delayed by the Engineer in writing for an unreasonable period of time (not originally anticipated, customary, or inherent to the construction industry) and you believe that additional compensation and/or contract time is due as a result of such suspension or delay, you must submit to the Engineer in writing a request for adjustment within 7 calendar days of receipt of the notice to resume work. The request shall set forth the reasons and support for such adjustment.

Upon receipt, the Engineer will evaluate your request. If the Engineer agrees that the cost and/or time required for the performance of the Contract has increased as a result of such suspension and the suspension was caused by conditions beyond your control of and not the fault of you, your suppliers, or your subcontractors at any approved tier, and not caused by weather, the Engineer will make an adjustment (excluding profit) and modify the Contract in writing accordingly. You will be notified of the Engineer's determination whether or not an adjustment of the Contract is warranted.

No contract adjustment will be allowed unless you have submitted the request for adjustment within the time prescribed.

No contract adjustment will be allowed under this clause to the extent that performance would have been suspended or delayed by any other cause, or for which an adjustment is provided or excluded under any other term or condition of this Contract.

8-1.07 DELAYS

8-1.07A General

~~To request a delay-related time or payment adjustment, submit an RFI.~~

You will not be held responsible for delays in completion of the Contract caused by:

1. Strikes
2. Labor disturbances

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3. Lack or failure of transportation
4. Acts of any governmental agency
5. Rearrangement of existing utility facilities by others
6. Rearrangement of existing facilities not shown
7. Other reasons acceptable to the Engineer such as events deemed by the Engineer to be outside of your control and not reasonably foreseeable when the work began.

When a delay occurs under any of the foregoing reasons, submit an RFI within 5 working days. If the Engineer determines such cause to exist, you may be granted an extension of time equal to or appropriate to the delay, or the Engineer may refer the matter to the Board of the Agency, which may, at its option, rescind the Contract and pay you the reasonable value of the work completed. If the latter, a new contract for the remainder of the work may be let.

No extension of time will be granted for a delay caused by a physical shortage of materials unless you submit proof of your efforts to obtain such materials from all known sources within reasonable reach of the work in a diligent and timely manner. Additionally, you must submit proof that any such shortage did cause a delay in the final completion of the entire work which could not be compensated for by a revision of the sequence of your operations.

Claims for damages for delays which do not result in a completion date exceeding the number of working days allocated in the Contract will not be considered.

8-1.07B Time Adjustments

The Agency may make a time adjustment for a critical delay. The Engineer uses information from the schedule to evaluate requests for time adjustments.

To request an adjustment, submit a revised schedule showing the delay's effect on the controlling activity. If the delay has:

1. Occurred, submit records of the dates and what work was performed during the delayed activity
2. Not occurred, submit the expected dates or duration of the delayed activity

Update the schedule to the last working day before the start of the delay if ordered.

8-1.07C Payment Adjustments

The Agency may make a payment adjustment for an excusable delay that affects your costs.

Only losses for idle equipment, idle workers, and moving or transporting equipment are eligible for delay-related payment adjustments.

The Engineer determines payment for idle time of equipment in the same manner as determinations are made for equipment used in the performance of force account work under section 9-1.04 with the following exceptions:

1. Delay factor in the *Labor Surcharge and Equipment Rental Rates* applies to each equipment rental rate.
2. Daily number of payable hours equals the normal working hours during the delay, not to exceed 8 hours per day.
3. Delay days exclude non-working days.
4. Markups are not added.

The Engineer determines payment adjustment for the idle workers under section 9-1.04B, but does not add markups.

The Engineer includes costs due to necessary extra moving or transporting of equipment.

The Agency does not make a payment adjustment for overhead incurred during non-working days of additional construction seasons experienced because of delay.

8-1.08 RESERVED**8-1.09 VIRTUAL PROJECT MANAGER****8-1.09A General**

Virtual Project Manager (VPM) is an Internet based electronic project management system used to create, share, and review construction management documentation online at www.virtual-pm.com.

You must utilize VPM for the submission of all Project data and documents, unless otherwise described or directed.

Access permission to VPM is provided as part of the Project at no cost to you. VPM will be made available to you, your subcontractors, suppliers, consultants, the Engineer and the Engineer's representatives or agents. The joint use of the system is to facilitate electronic exchange of information, automation of key processes, electronic notification of project activity, and overall management of contract documentation.

8-1.09B IT Requirements

You and your subcontractors must possess the necessary equipment, software, and Internet access to connect with and properly utilize VPM. A document scanner and/or a digital camera may be required.

8-1.09C Access

The Engineer will establish your access to VPM by enabling access and assigning user profiles to your personnel, including subcontractors and suppliers, that you request.

Provide a list of key VPM personnel for the Engineer's acceptance. The list must include:

1. First name
2. Last name
3. Address
4. Title
5. Office phone number
6. Cell phone number
7. Email address

All authorized personnel will have an individual user profile. No joint-use or shared user profiles will be allowed.

Each user profile will be assigned to a user group having specific permission settings and privileges based on the user's need with VPM.

8-1.09D Responsibilities

You are responsible for the:

1. Provision and accessibility of adequate resources to connect with VPM
2. Training of personnel to understand and utilize VPM
3. Entry of information exchanged and transferred between you and your subcontractors/suppliers on VPM
4. Accuracy and completeness of the information provided through VPM

8-1.09E Electronic Submissions

Submit the following items electronically using VPM:

1. Change order requests
2. Transmittals: Schedules, etcetera
3. Submittals: Submittals requiring approval
4. Requests for Information (RFIs)
5. Payment requests

8-1.10 LIQUIDATED DAMAGES ~~(Pub Cont Code § 10226)~~**8-1.10A General**

The Agency specifies liquidated damages ~~(Pub Cont Code § 10226)~~. Liquidated damages, if any, accrue starting on the 1st day after the expiration of the working days through the day of Contract acceptance except as specified in sections 8-1.10B and 8-1.10C.

The Agency withholds liquidated damages before the accrual date if the anticipated liquidated damages may exceed the value of the remaining work.

Liquidated damages for all work except plant establishment or permanent erosion control establishment are as shown in the following table:

Liquidated Damages		
Total bid		Liquidated damages per day
From over	To	
\$0	\$60,000	\$1,400
\$60,000	\$200,000	\$2,900
\$200,000	\$500,000	\$3,200
\$500,000	\$1,000,000	\$3,500
\$1,000,000	\$2,000,000	\$4,000
\$2,000,000	\$5,000,000	\$4,800
\$5,000,000	\$10,000,000	\$6,800
\$10,000,000	\$20,000,000	\$10,000
\$20,000,000	\$50,000,000	\$13,500
\$50,000,000	\$100,000,000	\$19,200
\$100,000,000	\$250,000,000	\$25,300

If all work except plant establishment or permanent erosion control establishment is complete and the total number of working days have expired, liquidated damages are \$950 per day.

8-1.10B Failure to Complete Work Parts within Specified Times

The Agency may deduct specified damages from payments for each day needed to complete a work part in excess of the time specified for completing the work part.

Damages for untimely completion of work parts may not be equal to the daily amount specified as liquidated damages for the project as a whole, but the Agency does not simultaneously assess damages for untimely completion of work parts and for the whole work.

Damages accrue starting the 1st day after a work part exceeds the specified time through the day the specified work part is complete.

8-1.10C Failure to Complete Work Parts by Specified Dates

The Agency may deduct specified damages from payments for each day needed to complete a work part in excess of the specified completion date for the work part.

Damages for untimely completion of a work part may not be equal to the daily amount specified as liquidated damages for the project as a whole, but the Agency does not simultaneously assess damages for untimely completion of a work part and the whole work.

Damages accrue starting the 1st day after an unmet completion date through the day the work part is complete.

8-1.10D Reserved**8-1.11–8-1.12 RESERVED****8-1.13 CONTRACTOR'S CONTROL TERMINATION**

The Agency may terminate your control of the work for failure to do any of the following ~~(Pub Cont Code § 10253)~~:

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1. Supply an adequate workforce
2. Supply material as described
3. Pay subcontractors (~~Pub Cont Code §10262~~)
4. Prosecute the work as described in the Contract

The Agency may also terminate your control for failure to maintain insurance coverage.

For a federal-aid project, the Agency may terminate your control of the work for failure to include "Required Contract Provisions, Federal-Aid Construction Contracts" in subcontracts.

The Agency gives notice to you and your surety at least 5 business days before terminating control. The notice describes the failures and the time allowed to remedy the failures. If failures are not remedied within the time provided, the Agency takes control of the work.

The Agency may complete the work if the Agency terminates the Contractor's control or you abandon the project (~~Pub Cont Code § 10255~~). The Agency determines the unpaid balance ~~under Pub Cont Code § 10258 and the Contract~~.

At any time before final payment of all claims, the Agency may convert a Contractor's control termination to a Contract termination.

8-1.14 CONTRACT TERMINATION

8-1.14A General

The Agency Board may terminate the Contract if it serves the County's/District's best interest. The Agency issues you a written notice, implements the termination, and pays you.

8-1.14B Relief from Responsibility for Work

Upon receiving a termination notice:

1. Stop work
2. Notify subcontractors and suppliers of the Contract termination and stop Contract-related work
3. Perform the Engineer-ordered work to secure the job site for termination
4. Remove equipment
5. Subject to the Engineer's authorization, settle termination-related claims and liabilities involving subcontractors and suppliers; assign to the County/District the rights, titles, or interests held by you with respect to these parties

8-1.14C Responsibility for Materials

Upon receiving a termination notice, protect unused material until:

1. You submit an inventory of materials already produced, purchased, or ordered but not yet used; include the location of the material.
2. The Engineer identifies materials that will be retained by the Agency. Submit bills of sales or other records of material title.
3. The Engineer confirms that unused materials paid by progress payment and materials furnished by the State have been delivered and stored as ordered.
4. The titles are transferred for materials purchased by the Agency.

Dispose of materials that will not be retained by the Agency.

8-1.14D Contract Acceptance after Termination

The Engineer recommends Contract acceptance after determining the completion of:

1. Work ordered to be completed before termination
2. Other work ordered to secure the project before termination
3. Material delivery and title transfer

The Agency pays you under section 9-1.17.

8-1.14E Payment Adjustment for Termination

If the Agency issues a termination notice, the Engineer determines the payment for termination during the performance period, from contract approval date to contract acceptance date, based on the following:

1. Direct cost for the work relating to termination:
 - 1.1. Including:
 - 1.1.1. Mobilization.
 - 1.1.2. Demobilization.
 - 1.1.3. Securing the job site for termination.
 - 1.1.4. Losses from the sale of materials.
 - 1.2. Not including:
 - 1.2.1. Cost of materials you keep.
 - 1.2.2. Profit realized from the sale of materials.
 - 1.2.3. Cost of material damaged by:
 - 1.2.3.1. Act of God.
 - 1.2.3.2. Act of a public enemy.
 - 1.2.3.3. Fire.
 - 1.2.3.4. Flood.
 - 1.2.3.5. Governor-declared state of emergency.
 - 1.2.3.6. Landslide.
 - 1.2.3.7. Tsunami.
 - 1.2.4. Other credits.
2. Cost of remedial work, as estimated by the Engineer, is not reimbursed.
3. Allowance for profit not to exceed 4 percent of the cost of the work where a likelihood of having made a profit had the Contract not been terminated is shown.
4. Material handling costs for material returned to the vendor or disposed of as ordered.
5. Costs in determining the payment adjustment due to the termination, excluding attorney fees and litigation costs.
6. Overhead costs.

Termination of the Contract does not relieve the surety of its obligation for any just claims arising out of the work performed.

8-1.15–8-1.16 RESERVED

9 PAYMENT

9-1.01 GENERAL

Section 9 includes specifications related to work payment.

9-1.02 MEASUREMENT

9-1.02A General

The Agency determines bid item quantities under US customary units.

Except for final pay item quantities, the Engineer measures quantities for payment.

The Engineer will measure the completed work on or about the twenty-fifth day of each month for the purpose of determining partial payments. If you prefer, and make the request in writing, the completed work may be measured on or about the first day of each month.

Only one of the above recurring monthly measurement days will be authorized for determining progress payments over the Contract duration.

9-1.02B Weighing Equipment and Procedures

9-1.02B(1) General

Measure material quantities for payment with devices that comply with:

1. 4 CA Code of Regs § 4000 et seq.
2. Bus & Prof Code § 12001 et seq.

To determine the material payment quantities, use measuring devices that have been sealed by the Department of Food and Agriculture's Division of Measurement Standards or its designated representative.

If a device is not type approved by the Division of Measurement Standards, type approve it under California Test 109.

Notify the Engineer at least 1 business day before equipment testing.

Use material plant controllers having elements affecting the data accuracy and delivery that have been sealed by the Engineer. Make these elements available to the Engineer for inspection. If the elements are adequate for use, the Engineer seals them. If manipulation of a security seal occurs, stop material production. Do not resume production until the Engineer reinspects and reseals the device.

Measure material paid for by weight on sealed scales regularly inspected by the Department of Food and Agriculture's Division of Measurement Standards or its designated representative.

Obtain authorization of portable vehicle scale installations before sealing.

9-1.02B(2) Equipment

Each scale must be long enough to fit an entire vehicle or a combination vehicle on the scale deck. The Agency allows you to weigh a combination vehicle separately if you disconnect the vehicles.

Construct scale undersupports:

1. Using portland cement concrete containing at least 470 pounds of cementitious material per cubic yard produced from commercial quality materials
2. Such that footing heights are at least 20 inches thick
3. With a bearing surface at least 30 inches wide and bearing pressure on the footing not over 4,000 lb/sq ft

In constructing a scale:

1. Provide drainage to prevent water from saturating the ground under the scale
2. Use bulkheads that prevent displacement
3. If shimming is necessary:
 - 3.1. Use securely attached metal shims or grout

- 3.2. Do not use wedges to shim the supports
- 3.3. Do not use shim material in excess of 3 inches
4. Install mechanical indicating elements level, plumb, and rigidly mounted on the concrete undersupports
5. For a hopper scale, rigidly attach the lever systems and mechanical indicating elements such that no weight is lost from bending or support distortion

Each scale used to determine material payment quantities must be operated by a licensed weighmaster (Bus & Prof Code § 12700 et seq.).

Submit a public weighmaster's certificate or certified daily summary weigh sheets for each weighed material quantity. The Agency may witness material weighing and check and compile the daily scale-weight record.

Each vehicle operator must obtain weight or load slips from the weighmaster. Submit these records at the delivery point.

9-1.02B(3) Procedures

Each day weigh empty vehicles used to haul material paid for by weight. Each vehicle must have a legible identification mark. The Agency may verify a material weight by having an empty and loaded vehicle weighed on any scale the Engineer designates.

If imported topsoil, soil amendment, wood mulch, or compost is measured by volume:

1. Each vehicle must allow for an accurate determination of its contents
2. Unless vehicles are of uniform capacity, each vehicle must have a legible identification mark showing its volumetric capacity
3. Load vehicles to at least the volumetric capacity
4. Level vehicle loads on arrival at the delivery point

If determining a quantity paid on a volume basis is impractical or if authorized, weigh the material and the Engineer converts the result to a volume measurement. The Engineer determines the conversion factors and, if you agree, adopts this method of measurement.

9-1.02C Final Pay Item Quantities

The Agency shows a bid item quantity as a final pay item for payment purposes only. For a final pay item, accept payment based on the Bid Item List quantity, regardless of the actual quantity used unless dimensions are changed by the Engineer.

9-1.02D Quantities of Aggregate and Other Roadway Materials

The Engineer determines the weights of aggregate and other roadway material that are being paid for by weight as shown in the following table and does not include the deducted weight of water in their payment quantities:

Determination of Quantities of Aggregate and Other Roadway Materials

Material	Quantity determination
Aggregate or other roadway material except as otherwise shown in this table	By deducting the weight of water in the material ^a in excess of 3 percent of the dry weight of the material from the weight of the material
Imported borrow, imported topsoil, AB	By deducting the weight of water in the material ^a in excess of 6 percent of the dry weight of the material from the weight of the material
Straw	By deducting the weight of water in the material ^a in excess of 15 percent of the dry weight of the material from the weight of the material
Fiber ^b	Engineer does not deduct the weight of water
AB and aggregate for CTBs	As specified in section 26 and section 27

NOTE: Percentage of water is determined by California Test 226.

^aAt the time of weighing

^bWeight of water in the fiber^a must not exceed 15 percent of the dry weight of the fiber.

9-1.03 PAYMENT SCOPE

The Agency pays you for furnishing the resources and activities required to complete the work. The Agency's payment is full compensation for furnishing the resources and activities, including:

1. Risk, loss, damage repair, or cost of whatever character arising from or relating to the work and performance of the work
2. PLACs and taxes
3. Any royalties and costs arising from patents, trademarks, and copyrights involved in the work

The Agency does not pay for your loss, damage, repair, or extra costs of whatever character arising from or relating to the work that is a direct or indirect result of your choice of construction methods, materials, equipment, or manpower, unless specifically mandated by the Contract.

Payment is:

1. Full compensation for all work involved in each bid item shown on the Bid Item List by the unit of measure shown for that bid item
2. For the price bid for each bid item shown on the Bid Item List or as changed by change order with a specified price adjustment

Full compensation for work specified in divisions I, II, and XI is included in the payment for the bid items involved unless:

1. Bid item for the work is shown on the Bid Item List
2. Work is specified as change order work

Work paid for under one bid item is not paid for under any other bid item.

Payment for a bid item includes payment for work in sections referenced by the section set forth by that bid item.

If an alternative is described in the Contract, the Agency pays based on the bid items for the details and specifications not described as an alternative unless the bid item is described as an alternative, in which case, the Agency pays based on the details and specifications for that alternative.

The Agency pays for change order work based on one or a combination of the following:

1. Bid item prices
2. Force account
3. Agreed price
4. Specialist billing

SECTION 9

PAYMENT

If the Engineer chooses to pay for change order work based on an agreed price, but you and the Engineer cannot agree on the price, the Agency pays by force account.

If a portion of extra work is covered by bid items, the Agency pays for this work as changed quantities in those items. The Agency pays for the remaining portion of the extra work by force account or agreed price.

The Agency pays 10 percent annual interest for unpaid and undisputed:

1. Progress payments
2. After-acceptance payment except for claims

For these payments, interest starts to accrue 30 days after the 1st working day following the 20th day of the month that payment is due. For a change order bill not submitted within 7 days after performing the work, interest starts to accrue 60 days after the 1st working day following the 20th day of the month that payment is due.

The Agency pays 6 7 percent annual interest for unpaid and undisputed claims. Interest starts to accrue 61 days after the Agency accepts a claim ~~statement~~ Pub Cont Code § 9204(d)(4)).

~~The Agency pays 6 percent annual interest for awards in arbitration (Civ Code § 3289).~~

If the amount of a deduction or withhold exceeds the final payment, the Agency invoices you for the difference, to be paid upon receipt.

Pay your subcontractors within 7 days of receipt of each progress payment ~~under Pub Cont Code §§ 10262 and 10262.5.~~

9-1.04 FORCE ACCOUNT

9-1.04A General

For work paid by force account, the Engineer compares the Agency's records to your daily force-account work report. When you and the Engineer agree on the contents of the daily force-account work reports, the Engineer accepts the report and the Agency pays for the work. If the records differ, the Agency pays for the work based only on the information shown on the Agency's records.

If a subcontractor performs work at force account, accept an additional 10 percent markup to the total cost of that work paid at force account, including markups specified in section 9-1.04, as reimbursement for additional administrative costs.

The markups specified for labor, materials, and equipment include compensation for all delay costs, overhead costs, and profit.

If an item's unit price is adjusted for work-character changes, the Agency excludes your cost of determining the adjustment.

Payment for owner-operated labor and equipment is made at the market-priced invoice submitted.

~~For nonsubcontracted work paid by force account for a contract with a TRO bid item, the markups are those shown in the following table instead of those specified in sections 9-1.04B-D:~~

<u>Cost</u>	<u>Percent markup</u>
<u>Labor</u>	<u>30</u>
<u>Materials</u>	<u>10</u>
<u>Equipment rental</u>	<u>10</u>

9-1.04B Labor

Labor payment is full compensation for the cost of labor used in the direct performance of the work plus a 35 percent markup. Force-account labor payment consists of:

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1. Employer payment to the worker for:
 - 1.1. Basic hourly wage
 - 1.2. Health and welfare
 - 1.3. Pension
 - 1.4. Vacation
 - 1.5. Training
 - 1.6. Other State- and federal-recognized fringe benefit payments
2. Labor surcharge percentage in *Labor Surcharge and Equipment Rental Rates* current during the work paid at force account for:
 - 2.1. Workers' compensation insurance
 - 2.2. Social security
 - 2.3. Medicare
 - 2.4. Federal unemployment insurance
 - 2.5. State unemployment insurance
 - 2.6. State training taxes
3. Subsistence and travel allowances paid to the workers
4. Employer payment to supervisors if authorized

The 35 percent markup consists of payment for all overhead costs related to labor but not designated as costs of the labor used in the direct performance of the work, including:

1. Home office overhead
2. Field office overhead
3. Bond costs
4. Profit
5. Labor liability insurance
6. Other fixed or administrative costs that are not costs of the labor used in the direct performance of the work

9-1.04C Materials

Material payment is full compensation for materials you furnish and use in the work. The Engineer determines the cost based on the material purchase price, including delivery charges, except:

1. 15 percent markup is added
2. Supplier discounts are subtracted whether you took them or not
3. If the Engineer believes the material purchase prices are excessive, the Agency pays the lowest current wholesale price for a similar material quantity
4. If you procured the materials from a source you wholly or partially own, the determined cost is based on the lower of the:
 - 4.1. Price paid by the purchaser for similar materials from that source on Contract items
 - 4.2. Current wholesale price for those materials
5. If you do not submit a material cost record within 30 days of billing, the determined cost is based on the lowest wholesale price:
 - 5.1. During that period
 - 5.2. In the quantities used

9-1.04D Equipment Rental

9-1.04D(1) General

Equipment rental payment is full compensation for:

1. Rental equipment costs, including moving the equipment to and from the change order work site using its own power.
2. Transport equipment costs for rental equipment that cannot be transported economically using its own power. No payment is made during transport for the transported equipment.
3. 15 percent markup.

If you want to return the equipment to a location other than its original location, the payment to move the equipment must not exceed the cost of returning the equipment to its original location. If you use the

equipment for work other than work paid by force account, the transportation cost is included in the other work.

Before moving or loading the equipment, obtain authorization for the equipment rental's original location.

The Engineer determines rental costs:

1. Using the rates in *Labor Surcharge and Equipment Rental Rates*:
 - 1.1. By classifying equipment using manufacturer's ratings and manufacturer-approved changes.
 - 1.2. Current during the work paid by force account.
 - 1.3. Regardless of equipment ownership; but the Agency uses the rental document rates or minimum rental cost terms if:
 - 1.3.1. Rented from an equipment business you do not own.
 - 1.3.2. Hourly rate in *Labor Surcharge and Equipment Rental Rates* is \$10.00 per hour or less.
2. Using the rates established by the Engineer for equipment not listed in *Labor Surcharge and Equipment Rental Rates*. You may submit cost information that helps the Engineer establish the rental rate; but the Agency uses the rental document rates or minimum rental cost terms if:
 - 2.1. Rented from an equipment business you do not own.
 - 2.2. The Engineer establishes a rate of \$10.00 per hour or less.
3. Using rates for transport equipment not exceeding the hourly rates charged by established haulers.

Equipment rental rates include the cost of:

1. Fuel	7. Repairs and maintenance
2. Oil	8. Depreciation
3. Lubrication	9. Storage
4. Supplies	10. Insurance
5. Small tools that are not consumed by use	11. Incidentals
6. Necessary attachments	

The Agency pays for small tools consumed by use. The Engineer determines the payment for small tools consumed by use based on Contractor-submitted invoices.

The Engineer may authorize rates in excess of those in the *Labor Surcharge and Equipment Rental Rates* if:

1. You submit a request to use rented equipment
2. Equipment is not available from your normal sources or from one of your subcontractors
3. Rented equipment is from an independent rental company
4. Proposed equipment rental rate is reasonable
5. The Engineer authorizes the equipment source and the rental rate before you use the equipment

The Agency pays for fuel consumed during the operation of rented equipment not included in the invoiced rental rates.

9-1.04D(2) Equipment On the Job Site

For equipment on the job site at the time required to perform work paid by force account, the time paid is the time:

1. To move the equipment to the location of work paid by force account plus an equal amount of time to move the equipment to another location on the job site when the work paid by force account is completed
2. To load and unload equipment
3. Equipment is operated to perform work paid by force account and:
 - 3.1. Hourly rates are paid in 1/2-hour increments
 - 3.2. Daily rates are paid in 1/2-day increments

9-1.04D(3) Equipment Not On the Job Site and Not Required for Original-Contract Work

For equipment not on the job site at the time required to perform work paid by force account and not required for the original Contract work, the time paid is the time the equipment is operated to perform work paid by force account and the time to return the equipment to its source when the work paid by force account is completed.

The minimum total time paid is:

1. 1 day if daily rates are paid
2. 8 hours if hourly rates are paid

If daily rates are recorded, equipment:

1. Idled is paid as 1/2 day
2. Operated less than 4 hours is paid as 1/2 day
3. Operated 4 hours or more is paid as 1 day

If the minimum total time exceeds 8 hours and if hourly rates are listed, the Agency rounds up hours operated to the nearest 1/2-hour increment and pays based on the hours shown the following table. The table does not apply when equipment is not operated due to breakdowns, in which case rental hours are the hours the equipment was operated.

Equipment Rental Hours

Hours operated	Hours paid
0.0	4.00
0.5	4.25
1.0	4.50
1.5	4.75
2.0	5.00
2.5	5.25
3.0	5.50
3.5	5.75
4.0	6.00
4.5	6.25
5.0	6.50
5.5	6.75
6.0	7.00
6.5	7.25
7.0	7.50
7.5	7.75
≥ 8.0	hours used

9-1.04D(4) Equipment Not On the Job Site and Required for Original-Contract Work

For equipment not on the job site at the time required to perform work paid by force account and required for the original Contract work, the time paid is the time:

1. To move the equipment to the location of work paid by force account plus an equal amount of time to move the equipment to a location on the job site or its source when the work paid by force account is completed
2. Equipment is operated to perform work paid by force account

9-1.04D(5) Non-Owner-Operated Dump Truck Rental

Submit the rental rate for a non-owner-operated dump truck. The Engineer determines the payment rate. Payment for the rental of a non-owner-operated dump truck is for the cost of renting a dump truck, including its driver. For the purpose of markup payment only, the non-owner-operated dump truck is rental equipment and the owner is a subcontractor.

9-1.05 EXTRA WORK PERFORMED BY SPECIALISTS

If the Engineer determines that you or your subcontractors are not capable of performing specialty extra work, a specialist may be used. Itemize the labor, material, and equipment rental costs unless it is not the special service industry's established practice to provide itemization, in which case, the Engineer accepts current market-priced invoices for the work.

The Engineer may accept an invoice as a specialist billing for work performed at an off-job site manufacturing plant or machine shop.

The Engineer determines the cost based on the specialist invoice price minus any available or offered discounts plus a 10 percent markup.

9-1.06 CHANGED QUANTITY PAYMENT ADJUSTMENTS**9-1.06A General**

The unit prices specified in section 9-1.06 are adjusted under section 9-1.04.

9-1.06B Increases of More Than 25 Percent

If the total bid item quantity exceeds 125 percent of the quantity shown on the Bid Item List and if no approved Change Order addresses payment for the quantity exceeding 125 percent, the Engineer may adjust the unit price for the excess quantity under section 9-1.04 or the following:

1. The adjustment is the difference between the unit price and the unit cost of the total item pay quantity.
2. In determining the unit cost, the Engineer excludes the item's fixed costs. You have recovered the fixed costs in the payment for 125 percent shown on the Bid Item List.
3. After excluding fixed costs, the Engineer determines the item unit cost under section 9-1.04.

If the payment for the number of units of a bid item in excess of 125 percent of the Bid Item List is less than \$5,000 at the unit price, the Engineer may not adjust the unit price unless you request it.

9-1.06C Decreases of More Than 25 Percent

If the total item pay quantity is less than 75 percent of the quantity shown on the Bid Item List and if no approved Change Order addresses payment for the quantity less than 75 percent, you may request a unit price adjustment. The Engineer may adjust the unit price for the decreased quantity under section 9-1.04 or the following:

1. The adjustment is the difference between the unit price and the unit cost of the total pay quantity.
2. In determining the unit cost, the Engineer includes the item's fixed costs.
3. After including fixed costs, the Engineer determines the item unit cost under section 9-1.04.

The Agency does not pay more than 75 percent of the item total in the Bid Item List.

9-1.06D Eliminated Items

If the Engineer eliminates an item, the Engineer notifies you and the Agency pays your costs incurred before the notification date.

If you order authorized material for an eliminated item before the notification date and the order cannot be canceled, either of the following occurs:

1. If the material is returnable to the vendor, the Engineer orders you to return the material and the Agency pays your handling costs and vendor charges.
2. The Agency pays your cost for the material and its handling and becomes the material owner.

The Engineer determines the payment for the eliminated bid item under section 9-1.04.

9-1.07 PAYMENT ADJUSTMENTS FOR PRICE INDEX FLUCTUATIONS

Not Used

SECTION 9

PAYMENT

9-1.08–9-1.10 RESERVED

9-1.11 TIME-RELATED OVERHEAD

Not Used

9-1.12–9-1.14 RESERVED

9-1.15 WORK-CHARACTER CHANGES

The Agency adjusts a bid item unit price based on the difference between the cost to perform the work as planned and the cost to perform the work as changed. The Engineer determines the payment adjustment under section 9-1.04. The Agency adjusts payment for only the work portion that changed in character.

9-1.16 PROGRESS PAYMENTS

9-1.16A General

The Agency pays you based on Engineer-prepared monthly progress estimates. Each estimate reflects:

1. Total work completed during the pay period
2. Change order bills if submitted in and approved sufficiently in advance.
~~2.1. Submitted by the 15th day of a month~~
~~2.2. Approved by the 20th day of a month~~
3. Amount for materials on hand pursuant to section 9-1.16C
4. Amount earned for mobilization
5. Deductions
6. Withholds
7. Resolved potential claims
8. Payment adjustments

Submit certification stating the work complies with the QC procedures. The Engineer does not process a progress estimate without a signed certification.

9-1.16B Schedule of Values

Section 9-1.16B applies to a lump sum bid item for which a schedule of values is specified to be submitted.

The sum of the amounts for the work units listed in the schedule of values must equal the lump sum price bid for the bid item.

Obtain authorization for a schedule of values before you perform work shown on the schedule. The Agency does not process a progress payment for the bid item without an authorized schedule of values.

Accept progress payments for overhead, profit, bond costs, and other fixed or administrative costs as distributed proportionally among the items listed except that for a contract with a bid item for mobilization, accept progress payments for bond costs as included in the mobilization bid item.

For changed quantities of the work units listed, the Agency adjusts payments in the same manner as specified for changed quantities of bid items under section 9-1.06.

9-1.16C Materials On Hand

9-1.16C(1) General

A material on hand but not incorporated into the work ~~is~~ may be eligible for a progress payment if:

1. Compliant with other Contract parts
2. Material cost exceeds \$50,000 either of the following:
~~2.1. \$50,000~~
~~2.2. \$25,000 if the requestor is certified as one or more of the following:~~
~~2.2.1. DVBE~~
~~2.2.2. DBE~~
~~2.2.3. Small business as certified by Department of General Services, Office of Small Business and Disabled Veteran Business Enterprise Services~~
3. Purchased

4. Invoice is submitted
5. Stored within Alameda County and you submit evidence that the stored material is subject to the Agency's control
6. Protected from weather and contamination
7. Water pollution control measures are established and maintained
8. Requested on the Agency-furnished form

9-1.16C(2) Conditions

If the Agency elects to pay for stored materials, you may be paid 75-percent of the actual value of such materials and equipment if:

1. **Each request for payment includes a complete inventory of all materials and equipment for which payment is or has been requested. The inventory must provide the description, specification paragraph number reference, quantity and value of each item of the material and equipment that is added, deducted (i.e. incorporated in the work) and carried from the previous request for payment. Payment will not be made for completed work that contains material or equipment included in the inventory.**
2. **Each request for payment includes a copy of the invoice indicating that full payment has been made to the supplier or manufacturer of each item of material and equipment that is added to the inventory.**
3. **The materials and equipment are placed and secured at a location under the Agency's control.**
4. **The materials and equipment have been fabricated or altered specifically for the use on the work as determined by the Engineer. Except for materials and equipment stored on the site, payment will not be made on materials and equipment not so fabricated or altered to preclude possible use on other work. Such materials and equipment approved for payment must be stored in a bonded warehouse and proof of such storage must be attached to the request for payment.**
5. **The total payment will not exceed the total amount of retention**

9-1.16D Mobilization

9-1.16D(1) General

Section 9-1.16D applies if a bid item for mobilization is shown on the Bid Item List.

Payments for mobilization made under section 9-1.16D are in addition to the partial payments made under Pub Cont Code § 10261.

Section 9-1.16D(2) applies unless the Contract includes a special provision for section 9-1.16D(1) that specifies section 9-1.16D(3) applies.

9-1.16D(2) Mobilization for Projects Except for Those Over Water Requiring Marine Access

The Agency makes partial payments for mobilization under Pub Cont Code § 10264(a) except the amount of work completed does not include the amount earned for mobilization. The partial payment amount is reduced by a prorated amount bid in excess of the maximum allowed under Pub Cont Code § 10264(a)(5).

The Agency pays the item total for mobilization in excess of the maximum allowed under Pub Cont Code § 10264(a)(5) in the 1st payment after Contract acceptance.

9-1.16D(3) Mobilization for Projects Over Water Requiring Marine Access

The Agency makes partial payments for mobilization under Pub Cont Code § 10264(b) except the amount of work completed does not include the amount earned for mobilization. The partial payment amount is reduced by a prorated amount bid in excess of the maximum allowed under Pub Cont Code § 10264(b)(6).

The Agency pays the item total for mobilization in excess of the maximum allowed under Pub Cont Code § 10264(b)(6) in the 1st payment after Contract acceptance.

9-1.16E Withholds**9-1.16E(1) General**

The Agency may withhold payment for noncompliance.

The Agency returns the noncompliance withhold in the progress payment following the correction of noncompliance except as specified in section 9-1.16E(3).

Withholds are not retentions under Pub Cont Code § 7107 and do not accrue interest under Pub Cont Code § 10261.5.

Withholds are cumulative and independent of deductions.

Section 9-1.16E does not include all withholds that may be taken; the Agency may withhold other payments as specified.

9-1.16E(2) Progress Withholds

The Agency withholds 10 percent of a progress payment for noncompliant progress. Noncompliant progress occurs when:

1. Total days to date exceed 75 percent of the working days
2. Percent of the working days elapsed exceeds the percent of value of the work completed by more than 15 percent

The Engineer determines the percent of the working days elapsed by dividing the total days to date by the revised Contract working days and converting the quotient to a percentage.

The Engineer determines the percent value of the work completed by summing payments made to date and the amount due on the current progress estimate, dividing this sum by the current total estimated value of the work, and converting the quotient to a percentage. These amounts are shown on the Progress Payment Voucher form.

When the percent of the working days elapsed minus the percent value of work completed is less than or equal to 15 percent, the Agency returns the withhold in the next progress payment.

9-1.16E(3) Performance Failure Withholds

During each estimate period you fail to comply with a Contract part, including the submittal of a document as specified, such as QC plans, schedules, traffic control plans and water pollution control submittals, the Agency withholds a part of the progress payment except as specified below for the failure to submit a document during the last estimate period.

For 1 performance failure, the Agency withholds 25 percent of the progress payment but does not withhold more than 10 percent of the total bid.

For multiple performance failures, the Agency withholds 100 percent of the progress payment but does not withhold more than 10 percent of the total bid.

During the last estimate period, if you fail to submit a document as specified, the Agency withholds \$10,000 for each document. The Agency returns the withhold within 30 days after receipt of the document.

9-1.16E(4) Stop Notice Withholds

The Agency withholds payments to cover claims filed under Civ Code § 9000 et seq. The Agency withholds 125 percent of the value of the stop notice amount from the next progress payment due.

~~Stop notice information may be obtained from the Division of Accounting, Office of External Accounts Payable.~~

9-1.16E(5) Penalty Withholds

Penalties include fines and damages that are proposed, assessed, or levied against you or the Agency by a governmental agency or private lawsuit. Penalties are also payments made or costs incurred in settling

alleged violations of federal, State, or local laws, regulations, requirements, or PLACs. The cost incurred may include the amount spent for mitigation or correcting a violation.

If the Agency is assessed a penalty, the Agency may withhold the penalty amount until the penalty disposition has been resolved. The Agency may withhold penalty amounts without notifying you.

Instead of the withhold, you may provide a bond equal to the highest estimated liability for any disputed penalties proposed except you may not provide a bond for withholds related to labor compliance violations.

9-1.16E(6)–9-1.16E(10) Reserved

9-1.16F Retentions

Section 9-1.16F applies before January 1, 2020.

The Agency ~~does not retain monies~~ retains 5 percent from progress payments due to the Contractor for work performed ~~(Pub Cont Code § 7202)~~.

You may substitute securities for retentions held by the Agency pursuant to Pub Cont Code § 22030.

9-1.16G Prompt Payment of Funds Withheld to Subcontractors

The Agency retains funds under section 9-16F. You and your subcontractor must return all monies withheld in retention from a subcontractor within 7 days after receiving payment for work satisfactorily completed and accepted including incremental acceptance of portions of the contract work by the Agency, unless as agreed to in writing by you and your subcontractor, pursuant to section 7108.5 of the Business and Professions Code. Any violation of the provision will subject you or your subcontractor to penalties, sanctions and other remedies specified in the Code. These requirements do not limit or impair any contractual, administrative, or judicial remedies otherwise available to you or your subcontractor in the event of a dispute involving late payment or nonpayment by you, deficient subcontract performance, or noncompliance by a subcontractor.

9-1.16H – 9-1.16M Reserved

9-1.17 PAYMENT AFTER CONTRACT ACCEPTANCE

9-1.17A General

Reserved

9-1.17B Payment Before Final Estimate

After Contract acceptance, the Agency pays you based on the Engineer-prepared estimate that includes withholds and the balance due after the deduction of previous payments.

9-1.17C Proposed Final Estimate

The Engineer estimates the amount of work completed and shows the amount payable in a proposed final estimate based on:

1. Contract items
2. Payment adjustments
3. Work paid by force account or agreed price
4. Extra work
5. Deductions

Submit either a written acceptance of the proposed final estimate or a claim statement postmarked or hand delivered before the 31st day after receiving the proposed final estimate.

If you claim that the total work completed, excluding deductions, in the proposed final estimate is less than 90 percent of your total bid, the Agency adjusts the final payment to cover your overhead. The adjustment in the final estimate is 10 percent of the difference between 90 percent of your total bid and the total for work completed, excluding deductions.. The Agency does not make this adjustment on a terminated contract.

9-1.17D Final Payment and Claims**9-1.17D(1) General**

If you accept the proposed final estimate or do not submit a claim ~~statement~~ within 30 days of receiving the estimate, the Engineer provides you the final estimate and the Agency pays the amount due within 30 days. This final estimate and payment is conclusive except as specified in sections 5-1.27, 5-1.47, and 9-1.21.

If you submit a claim ~~statement~~ within 30 days of receiving the Engineer's proposed final estimate, the Engineer provides you a semifinal estimate and the Agency pays the amount due within 30 days. The semifinal estimate is conclusive as to the amount of work completed and the amount payable except as affected by any claims or as specified in sections 5-1.27, 5-1.47, and 9-1.21.

9-1.17D(2) Claims ~~Statement~~**9-1.17D(2)(a) General**

~~For each claim, submit a claim statement showing only the identification number that corresponds to the Full and Final Potential Claim Record form and the final amount of the additional payment requested except:~~

- ~~1. If the final amount of the requested payment differs from the amount requested in the Full and Final Potential Claim Record form~~
- ~~2. For a claim for quantities, withholds, deductions, liquidated damages, or change order bills~~
- ~~3. For an overhead claim~~

~~If the final amount of the requested payment differs from the amount requested in the Full and Final Potential Claim Record form, submit:~~

- ~~1. Identification number that corresponds to the Full and Final Potential Claim Record form~~
- ~~2. Final amount of additional payment requested~~
- ~~3. Basis for the changed amount~~
- ~~4. Contract documentation that supports the changed amount~~
- ~~5. Statement of the reasons the Contract documentation supports the claim~~

~~The Engineer notifies you of an omission of or a disparity in the exclusive identification number. Within 15 days of the notification, correct the omission or disparity. If the omission or disparity is not resolved after 15 days, the Engineer assigns a new number.~~

~~For a claim for quantities, withholds, deductions, or change order bills submit:~~

- ~~1. Final amount of the additional payment requested~~
- ~~2. Enough detail to enable the Engineer to determine the basis and amounts of the additional payment requested~~

Claims are handled in accordance with Pub Cont Code §§ 9201 – 9204 and § 9204 is deemed incorporated by reference herein, as though fully set forth, provided, however, that these specifications prescribe additional change order, claim and dispute resolution procedures and required administrative procedures.

“Claim” means a separate demand by a contractor sent by registered mail or certified mail with return receipt requested, for one or more of the following:

1. A time extension, including, without limitation, for relief from damages or penalties for delay assessed by the Agency.
2. Payment by the Agency of money or damages arising from work done by you, or on your behalf pursuant to the Contract and payment for which is not otherwise expressly provided or to which you are not otherwise entitled.
3. Payment of an amount that is disputed by the Agency.

For any claim arising prior to the issuance of the proposed final estimate, include the identification number that corresponds to the Full and Final Potential Claim Record form and the

final amount of additional payment requested. Provide documentation to support the claim, including the potential claim record documents required under section 5-1.43 and the supporting documentation for overhead claims required herein. You must include a statement of the reasons the Contract documentation supports the claim. You are responsible for furnishing, within a reasonable time, such further information and details as may be required by the Engineer to determine the facts or contentions involved in the claims.

For a claim for quantities, withholds, deductions, or change order bills submit:

1. Final amount of the additional payment requested
2. Enough detail to enable the Engineer to determine the basis and amounts of the additional payment requested

9-1.17D(2)(b) Overhead Claims

Include with an overhead claim:

1. Final amount of additional payment requested
2. Independent CPA audit report

~~Failure to submit the audit report with an overhead claim with the claim statement is a waiver of the overhead claim and operates as a bar to arbitration on the claim (Pub Cent Code § 10240.2).~~

The Agency deducts an amount for field and home office overhead paid on added work from any claim for overhead. The value of the added work equals the value of the work completed minus the total bid. The home office overhead deduction equals 5 percent of the added work. The field office overhead deduction equals 5-1/2 percent of the added work.

If you intend to pursue a claim for reimbursement for field or home office overhead beyond that provided expressly by the Contract:

1. Notify the Engineer within 30 days of receiving the proposed final estimate of your intent to seek reimbursement for specific overhead costs beyond that provided by the Contract
2. Specifically identify each claim and each date associated with each claim for which you seek reimbursement for specific overhead costs beyond that provided by the Contract
3. Timely submit all other claims
4. Within 30 days of receiving the proposed final estimate, submit an audit report prepared by an independent CPA, including
 - 4.1. Calculations with supporting documentation of actual home office and project field overhead costs
 - 4.2. Calculations specifying the actual daily rates for both field and home office overhead, not including a profit markup, for the entire duration of the project expressed as a rate per working day
 - 4.3. Start and end dates of the actual project performance period, number of working days, overhead cost pools, and all allocation bases used to calculate your actual field and home office overhead daily rates
5. Field overhead costs from which the daily rate is calculated must be:
 - 5.1. Allowable under 48 CFR 31
 - 5.2. Supported by reliable records
 - 5.3. Related solely to the project
 - 5.4. Incurred during the actual project performance period
 - 5.5. Comprised of only time-related field overhead costs
 - 5.6. Not a direct cost
6. Home-office overhead costs from which the daily rate is calculated must be:
 - 6.1. Allowable under 48 CFR 31
 - 6.2. Supported by reliable records
 - 6.3. Incurred during the actual project performance period
 - 6.4. Comprised of only fixed home-office overhead costs
 - 6.5. Not a direct cost

The actual rate of time-related overhead is subject to authorization by the Engineer.

The CPA's audit must be performed as an examination-level engagement under the attestation engagements in the *Government Auditing Standards* published by the Comptroller General of the United States. The CPA's audit report must express an opinion of whether or not your calculations of your actual field and home office overhead daily rates comply with section 9-1.17D(2)(b). The attest documentation prepared by the CPA in connection with the audit must be submitted for review with the audit report.

The Agency provides markups for all work paid by force account. Overhead for field and home office costs are included in the markups. Overhead claims in excess of Contract markups are not allowed under the Contract. If you seek reimbursement for costs not allowed under the Contract, the Agency does not pay your cost of performing the independent CPA examination specified in section 9-1.17D(2)(b), including preparation of the audit report.

9-1.17D(2)(c) Declaration

Submit a declaration that includes the following language with any the claim statement:

I declare under penalty of perjury, according to the laws of the State of California, that the foregoing claims, with specific reference to the California False Claims Act (Govt Code § 12650 et seq.) and to the extent the project contains federal funding, the US False Claims Act (31 USC § 3729 et seq.), are true and correct, and that this declaration was signed on _____ (date) _____, 20__ at _____, California.

9-1.17D(2)(d) Waiver

Not Used

9-1.17D(3) Final Determination of Claims

~~Failure to allow timely access to the supporting data for a claim when requested waives the claim.~~

~~The Agency's costs in reviewing or auditing a claim not supported by the Contractor's accounting or other records are damages incurred by the State within the meaning of the California False Claims Act.~~

~~If the Engineer determines that a claim requires additional analysis, the Engineer schedules a review board meeting. Meet with the board of review and make a presentation supporting the claim.~~

~~After the Engineer or review board finishes reviewing the claim, the Agency makes the final determination of claims and provides it to you.~~

~~The Engineer provides you a final estimate and the Agency pays the amount due within 30 days. The final estimate is conclusive as to the amount of work completed and the amount payable except as specified in sections 5-1.27, 5-1.47, and 9-1.21.~~

~~Your failure to comply with the claim procedures is a bar to arbitration under Pub Cont Code § 40240.2.~~

9-1.17D(3)(a) Review of Claim

Upon receipt of claim the Agency will conduct a reasonable review and will provide you a written statement identifying what portion of the claim is disputed and what portion is undisputed. This will be done within 45 days, unless a longer period is mutually agreed upon. If the Agency needs approval from its governing body to provide a written statement, and the governing body does not meet within 45 days following receipt or within a mutually-agreed extension, then the Agency shall have up to three days following the next duly publicly noticed meeting of the governing body to provide a written statement.

Any payment due on an undisputed portion of the claim will be processed and made within 60 days after the Agency issues its written statement.

If the Agency does not respond within the time period prescribed, the claim is to be deemed rejected in its entirety. This shall not constitute an adverse finding with regard to the merits of the claim or your responsibility or qualifications.

9-1.17D(3)(b) Meet and Confer Conference

If you dispute the Agency's written response to your claim, or if the Agency fails to respond within the time prescribed, you may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a written demand sent by registered mail or certified mail, return receipt requested, the Agency will schedule a meet and confer conference within 30 days for settlement of the dispute.

Within 10 business days following the conclusion of the meet and confer conference, if the claim or any portion thereof remains in dispute, the Agency will provide you a written statement identifying the portion that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the claim will be processed and made within 60 days after the Agency issues its written statement.

9-1.17D(3)(c) Mediation

Following the written statement issued after the meet and confer conference if you continue to dispute any portion of the claim, you must identify that dispute in writing, and that disputed will be submitted to nonbinding mediation, where you and the Agency share the associated costs equally. You and the Agency must mutually agree to a mediator within 10 business days after you identify the disputed portion of the claim. If agreement upon a mediator cannot be reached, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. If mediation is unsuccessful, the parts of the claim remaining in dispute shall be settled under section 9-1.22.

For the purpose of this section, mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the parties in dispute resolution through negotiation or by issuance of an evaluation.

9-1.17D(3)(d) Subcontractor Claim

If a subcontractor or a lower tier subcontractor lacks legal standing to assert a claim against the County/District because privity of contract does not exist, you may present a claim on behalf of a subcontractor or lower tier subcontractor. A subcontractor may request in writing, either on his or her own behalf or on behalf of a lower tier subcontractor, that you present a claim for work which was performed by the subcontractor or by a lower tier subcontractor on behalf of the subcontractor. The subcontractor requesting that the claim be presented to the Agency must furnish reasonable documentation to support the claim. Within 45 days of receipt of this written request, you must notify the subcontractor in writing as to whether you presented the claim to the Agency and, if not, provide the subcontractor with a statement of the reasons for not having done so.

9-1.17D(3)(e) Third Party Claim Notification

You will be notified in a timely manner of any third-party claim related to the contract.

9-1.18–9-1.20 RESERVED

9-1.21 CLERICAL ERRORS

For 3 years after Contract acceptance, estimates and payments are open to correction and adjustment for clerical errors. Either you or the Agency pays to the other the amount due except for clerical errors resulting in an adjustment less than \$200, in which case, no payment is made.

9-1.22 ARBITRATION

~~Pub Cont Code § 10240 through 10240.13 provides for the resolution of contract claims by arbitration.~~

~~Start arbitration by filing a complaint with the Office of Administrative Hearings in Sacramento (1 CA Code Regs § 1350). File the arbitration complaint no later than 90 days after receiving the Agency's final written decision on a claim (Pub Cont Code § 10240.1).~~

Pursuant to Pub Cont Code §§ 22201 and 9204(d)(2)(E), claims that remain disputed following mediation shall be resolved by arbitration unless the Engineer and Contractor agree in writing, after the claim has arisen, to waive arbitration and to have the claim litigated in a court of competent jurisdiction. Arbitration shall be pursuant to Pub Cont Code § 10240-10240.13, inclusive, and implementing regulations, provided, however, that the limitations period under § 10240.1 shall be tolled to allow for the meet and confer conference and mediation as provided herein and in Pub Cont Code § 9204. You must file your arbitration complaint not later than 90 days after the conclusion of the mediation. The arbitration decision shall be decided under and in accordance with the law of California, supported by substantial evidence and, in writing, shall contain the basis for the decision, findings of fact, and conclusions of law.

Start arbitration by filing a complaint with the Office of Administrative Hearings in Sacramento (1 CA Code Regs § 1350) through the Public Works Contract Arbitration Program.

Replace Division II with:

DIVISION II GENERAL CONSTRUCTION

10 GENERAL

10-1 GENERAL

10-1.01 GENERAL

Section 10 includes general specifications for performing construction work.

Where new construction work is to join existing improvements, finish the new in a manner that results in a complete, unified, and finished job, unless specified otherwise.

Cut, fit, and patch all work that may be required to make several parts come together properly and to prepare it to join or be joined by the work of others.

Do not endanger any work by cutting, digging, or other operation, or alter the work of others without authorization.

Do not display unauthorized signs on the job site.

10-1.02 WORK SEQUENCING

10-1.02A General

~~Reserved~~

If a stage order is shown, proceed in that manner. Do not begin a new stage of work until the preceding stage in the sequence is complete.

Comply with section 5-1.36D, "Survey Monuments," which requires the County Surveyor's acceptance of Pre-Construction Corner Records before the start of construction.

Comply with section 5-1.36C, "Non-County/District Facilities," which requires that utilities be located within the first 30-days.

10-1.02B Traffic Elements

Before starting the operational test of a traffic management system that directly impacts traffic, the system must be ready for operation, and all signs, pavement delineation, and pavement markings must be in place at the system's location.

If maintaining existing traffic management system elements during construction is shown on the Bid Item List, a list of the systems shown within the project limits and their operational status is included in the *Information Handout*. Before starting job site activities, conduct a preconstruction operational status check of the existing system's elements and each element's communication status with the transportation management center to which it communicates. If an existing system element is discovered and has not been identified, the Agency adds the element to the list of systems. The pre- and postconstruction operational status check of the discovered elements is change order work.

If maintaining existing traffic management system elements during construction is not shown on the Bid Item List and an existing system element is discovered during the work, notify the Engineer. The Engineer orders a pre- and postconstruction operational status check of the discovered elements. The status check of the discovered elements is change order work.

Conduct the status check with the Engineer and an electrical representative from the traffic operations office ~~of the district in which the work is located~~. The Agency provides you a list of the preconstruction operational status-check results, including:

1. Existing traffic management system elements and their locations within the project limits
2. Fully functioning elements
3. Nonoperational elements

Before Contract acceptance, conduct a postconstruction operational status check of all elements shown on the list with the Engineer and an electrical representative from the traffic operations office ~~of the district in which the work is located.~~

10-1.02C Landscaping and Irrigation Facilities

10-1.02C(1) General

Reserved

10-1.02C(2) Irrigation Facilities

Upon discovering an irrigation facility not described in the Contract, immediately notify the Engineer. ~~The Engineer orders the locating and protecting of the irrigation facility. The locating and protecting is change order work.~~

10-1.02C(3) Landscaping

Reserved

10-1.02D Traffic Stripes, Pavement Markings, and Pavement Markers

Before obliterating any traffic stripes, pavement markings, and pavement markers to be replaced at the same location, reference the stripes, markings, and markers. Include limits and transitions with control points to reestablish the new stripes, markings, and markers. Submit your references to the control points at least 5 business days before obliterating the stripes, markings, and markers.

10-1.02E Excavation

If a difference in excess of 0.15 foot exists between the elevation of the existing pavement and the elevation of an excavation within 5 feet of the left edge or within 8 feet of the right edge of the traveled way at the end of each working day, place and compact material against the vertical cut adjacent to the traveled way. During the excavation, you may use native material for this purpose except you must use structural material once you start placing the structural section. Place the material to the top of the existing pavement and taper at a slope of 4:1 (horizontal:vertical) or flatter to the bottom of the excavation. Do not use treated base for the taper.

10-1.03 TIME CONSTRAINTS

In addition to the constraints imposed by work sequencing provisions under section 10-1.02, comply with the constraints imposed under section 7-1.03, "Public Convenience" and under section 12-4.01A(5), Timeframe for Work the Interferes with Traffic."

10-1.04 TRAINING AND MEETINGS

At any time during the progress of the work, the Engineer can require you to attend a meeting regarding any aspect of the Project. You must comply with any notice of such a conference.

Training and meetings are held at times and locations you and the Engineer agree to.

10-1.05–10-1.10 RESERVED

10-2–10-3 RESERVED

10-4 WATER USAGE

Section 10-4 includes general specifications for using water for construction activities.

The Agency encourages you to conserve water in all construction activities.

The Engineer notifies you of any (1) water shortage or (2) mandate from a local water authority to ration water. Within 10 days of the notification, submit a water conservation plan. The plan must include:

1. List of construction activities that require water
2. Measures you will implement for each activity to conserve water
3. Method for curing concrete other than the water method if included in the work
4. Dust palliative you will use for dust control

10-5 DUST CONTROL

Section 10-5 includes general specifications for controlling dust resulting from the work.

Prevent and alleviate dust by:

1. Applying a dust palliative under section 18
2. Applying temporary soil stabilization under section 13-5
3. Managing material stockpiles under section 13-4.03C(3)

10-6 WATERING

Section 10-6 includes specifications for developing a water supply, furnishing water, and applying water.

Developing a water supply includes developing a supply of water and furnishing pipes or other equipment needed to convey the water to the water application equipment.

Water may be potable or nonpotable. Nonpotable water must be either recycled water or nonpotable water developed from other sources.

The sources and discharge of recycled water must comply with the water-recycling criteria of the CDPH, SWRCB Order No. WQ 2016-0068-DDW, and the requirements of the appropriate RWQCB. Obtain either a waste discharge permit or a waiver from the appropriate RWQCB for each water source. Submit a copy of the permit or waiver before using the water in the work.

If an available source of water is identified described in the Information Handout, verify the quality and quantity of water.

As permitted under section 13, apply water:

- 1) to excavation areas prior to excavating and/or during material loading, as necessary
- 2) to subgrade—frequently
- 3) to dusty imported aggregates prior to or immediately after placing on the subgrade
- 4) as directed by the Engineer

Nonpotable water must not be conveyed in tanks or drain pipes that will be used to convey potable water. Nonpotable water supplies and potable water supplies must not be connected. Nonpotable water supply, tanks, pipes, and other conveyances of nonpotable water must be labeled Nonpotable Water / Do Not Drink.

Each water storage tank and distribution system must be equipped with positive shut-off valves.

Keep at least 1 mobile unit with a capacity of at least 1,000 gal the job site at all times for applying water unless all water is applied through pipes or another authorized method.

For compacting embankment material, subbase, base, and surfacing material and for dust control, apply water with equipment that will apply it uniformly.

For compaction, you may use a chemical additive if authorized.

If a bid item for develop water supply is shown on the Bid Item List, the Agency does not adjust the lump sum price for any increase or decrease in the quantity of water required or for change order work.

10-7–10-50 RESERVED

11 WELDING

If welding is required for any part of your work, comply with section 11 of the Standard Specifications.

12 TEMPORARY TRAFFIC CONTROL

12-1 GENERAL

12-1.01 GENERAL

Section 12-1 includes general specifications for providing temporary traffic control.

Temporary traffic control, including flagging, apparel, temporary traffic control devices, and equipment for flaggers, must comply with the *California MUTCD*, Part 6, "Temporary Traffic Control."

Ensure compliance with section 7-1.04, "Public Safety."

12-1.02 MATERIALS

Not Used

12-1.03 CONSTRUCTION

Assign flaggers and provide and maintain fences, barriers, signs, guardrails, red lights and other safety devices to:

1. Control traffic
2. Warn the public of any dangerous conditions resulting from the work activities
3. Provide for the passage of traffic through the work as specified for the passage of traffic for public convenience and public safety

Maintain flagging apparel, traffic control devices, and equipment for flaggers in good repair.

12-1.04 PAYMENT

Not Used

12-2 RESERVED

12-3 TEMPORARY TRAFFIC CONTROL DEVICES

12-3.01 GENERAL

12-3.01A General

12-3.01A(1) Summary

Section 12-3.01 includes general specifications for providing temporary traffic control devices.

Providing temporary traffic control devices includes installing, placing, maintaining, repairing, replacing, and removing temporary traffic control devices.

Do not use different types of channelizing devices on the same alignment. The types include plastic drums, portable delineators, channelizers, tubular markers, traffic cones, and Type I and Type II barricades.

12-3.01A(2) Definitions

Category 1 temporary traffic control devices: Small devices weighing less than 100 lb certified as crashworthy by crash testing or crash testing of similar devices. Category 1 temporary traffic control devices include traffic cones, plastic traffic drums, portable delineators, and channelizers.

Category 2 temporary traffic control devices: Small devices weighing less than 100 lb that are not expected to produce significant changes in vehicular velocity but could cause harm to impacting vehicles. Category 2 temporary traffic control devices include barricades and portable sign supports.

Category 3 temporary traffic control devices: Devices weighing 100 lb or more that are expected to produce significant changes in the vehicular velocity of impacting vehicles. Category 3 temporary traffic control devices include crash cushions, impact attenuator vehicles, temporary railing, temporary barrier, and end treatments for temporary railings and barriers.

orange: Orange, red-orange, fluorescent orange, or fluorescent red-orange.

useable shoulder area: Any longitudinal paved or unpaved contiguous surface adjacent to the traveled way with:

SECTION 12

TEMPORARY TRAFFIC CONTROL

1. Enough weight-bearing capacity to support temporary traffic control devices, such as flashing arrow signs, PCMSs, and impact attenuator vehicles
2. Slope not greater than 6:1 (horizontal:vertical)

12-3.01A(3) Submittals

At least 5 business days before starting any work using the devices or within 2 business days after the request if the devices are already in use, submit as informational submittals:

1. Self-certification for crashworthiness of Category 1 temporary traffic control devices. Either you or the manufacturer must perform the self-certification. Include:
 - 1.1. Date
 - 1.2. Federal aid number for a federal-aid contract
 - 1.3. Contract number, ~~district, county,~~ route, and post miles of the project limits
 - 1.4. Company name, street address, city, state, and zip code of the certifying vendor
 - 1.5. Printed name, signature, and title of the certifying person
 - 1.6. Types of Category 1 temporary traffic control devices
2. List of proposed Category 2 temporary traffic control devices

Obtain a standard form for self-certification from the Engineer.

Submit a sample of the type of portable delineator that you will be using before placing the delineators on the job site.

12-3.01A(4) Quality Assurance

Reserved

12-3.01B Materials

The condition of temporary traffic control devices must comply with the most current edition of the American Traffic Safety Services Association publication *Quality Guidelines for Temporary Traffic Control Devices and Features*.

Category 2 temporary traffic control devices must be on FHWA's list of acceptable crashworthy Category 2 hardware for work zones. For this list, go to FHWA's Safety Program website.

Category 2 temporary traffic control devices must be labeled with the FHWA acceptance letter code and the name of the manufacturer. The label must be legible and permanently affixed to the temporary traffic control device by the manufacturer.

Category 3 temporary traffic control devices must be on the Authorized Material List for highway safety features.

Retroreflectivity for the following materials must comply with Table 2A-3, "Minimum Maintained Retroreflectivity Levels," of the *California MUTCD* and be on the Authorized Material List for signing and delineation materials:

1. Retroreflective sheeting for barricades
2. Retroreflective bands for portable delineators
3. Retroreflective sheeting for construction area signs
4. Retroreflective sheeting for channelizers
5. Reflectors for Type K temporary railing
6. Retroreflective cone sleeves
7. White and orange retroreflective stripes for plastic traffic drums

The following temporary traffic control devices must be visible from 1,000 feet during the hours of darkness under an illumination of legal high-beam headlights by persons with 20/20 vision or vision corrected to 20/20:

1. Retroreflective bands on portable delineators
2. Retroreflective sheeting on channelizers
3. Retroreflective cone sleeves on traffic cones

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12-3.01C Construction

Perform all layout work necessary to place channelizing devices:

1. On the proper alignment
2. Uniformly at the location and spacing described
3. Straight on a tangent alignment
4. On a true arc in a curved alignment

If temporary traffic control devices are damaged, displaced, or stop operating or functioning as described from any cause during the progress of the work, immediately repair, repaint, or replace the components and restore them to their original locations and positions.

If ordered, furnish and place additional temporary traffic control devices. This work is change order work unless the temporary traffic control devices are being furnished and placed for public safety or public convenience.

Level and plumb a portable system.

Delineate the location of a trailer mounted system with a taper consisting of 9 traffic cones placed 25 feet apart, except where the system is placed within a lane closure or behind a barrier or guardrail.

When a portable system is not in use, remove it from the job site, place it behind a barrier or guardrail, or move it to an area at least 15 feet from the edge of the traveled way.

12-3.01D Payment

Not Used

12-3.02 TRAFFIC CONES**12-3.02A General**

Section 12-3.02 includes specifications for placing traffic cones.

12-3.02B Materials

A traffic cone must be flexible, orange, and manufactured from commercial-quality material designed for the intended purpose.

The outer section of the portion above the base of the traffic cone must be translucent and fabricated of a highly pigmented, orange, PV compound. The overall height of a traffic cone must be at least 28 inches and the bottom inside diameter of the traffic cone must be at least 10.5 inches.

During the hours of darkness, a traffic cone must have a retroreflective cone sleeve.

Retroreflective cone sleeves must be permanently affixed, double-band, sleeves consisting of 2 white retroreflective bands. The top band must be 6 inches wide and placed a maximum of 4 inches from the top of the cone. The lower band must be 4 inches wide and placed 2 inches below the bottom of the top band. You may use traffic cones with double-band retroreflective cone sleeves during daylight hours.

12-3.02C Construction

Use the same type of retroreflective cone sleeve for all cones used on the project.

Anchor the base of a traffic cone if it does not have enough size and weight to keep the cone in an upright position.

12-3.02D Payment

Not Used

12-3.03 PLASTIC TRAFFIC DRUMS**12-3.03A General****12-3.03A(1) Summary**

Section 12-3.03 includes specifications for placing plastic traffic drums.

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SECTION 12

TEMPORARY TRAFFIC CONTROL

12-3.03A(2) Definitions

Reserved

12-3.03A(3) Submittals

Submit a certificate of compliance for plastic traffic drums.

12-3.03A(4) Quality Assurance

Reserved

12-3.03B Materials

A plastic traffic drum must comply with the manufacturer's instructions for weight and ballast.

A plastic traffic drum must:

1. Be orange LDPE
2. Be flexible and collapsible upon vehicle impact
3. Have a weighted base to maintain an upright position and prevent displacement by passing traffic
4. Have a height such that the top of the drum is at least 36 inches above the traveled way

The weighted base must:

1. Be detachable
2. Be shaped to prevent rolling upon impact
3. Have a 38-inch maximum outside diameter
4. Have a 4-inch maximum height above the ground surface

12-3.03C Construction

Use 1 type of plastic traffic drum on the project.

Use the same type and brand of retroreflective sheeting for all plastic traffic drums used on the project.

Do not use sandbags or comparable ballast.

Moving plastic traffic drums from location to location if ordered after initial placement is change order work.

12-3.03D Payment

Not Used

12-3.04 PORTABLE DELINEATORS

12-3.04A General

Section 12-3.04 includes specifications for placing portable delineators.

12-3.04B Materials

A portable delineator, including its base, must be made of a material that has enough rigidity to remain upright when unattended and must be flexible or collapsible upon impact by a vehicle. The base must be (1) shaped to prevent rolling after impact and (2) anchored or weigh enough to keep the delineator in an upright position. Ballast for a portable delineator must comply with the manufacturer's instructions.

A portable delineator must be a minimum of 36 inches in height. The vertical portion of a portable delineator must be predominantly orange. The post must be not less than 3 inches in width or diameter. Retroreflectorization of a portable delineator that has a height of less than 42 inches must be provided by two 3-inch-wide white bands placed a maximum of 2 inches from the top with a maximum of 6 inches between the bands. Retroreflectorization of a portable delineator that has a height of 42 inches or more must be provided by four 4- to 6-inch-wide alternating orange and white stripes with the top stripe being orange.

12-3.04C Construction

Use only 1 type of portable delineator on the project.

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12-3.04D Payment

Not Used

12-3.05 CHANNELIZERS**12-3.05A General**

Section 12-3.05 includes specifications for placing channelizers.

12-3.05B Materials

A channelizer must be on the Authorized Material List for signing and delineation materials.

Its post must be orange.

A channelizer must be affixed with 3-by-12-inch, retroreflective, white sheeting.

12-3.05C Construction

Install channelizers on clean, dry surfaces.

Cement the channelizer bases to the pavement as specified for cementing pavement markers to the pavement in section 81-3.

When no longer required for the work, remove the channelizers and the underlying adhesive used to cement the channelizer bases to the pavement.

Do not remove channelizers that are shown to be left in place at the time of work completion.

12-3.05D Payment

Not Used

12-3.06–12-3.09 RESERVED**12-3.10 BARRICADES****12-3.10A General**

Section 12-3.10 includes specifications for placing barricades.

12-3.10B Materials

Markings for barricade rails must be alternating orange and white retroreflective stripes.

Orange retroreflective sheeting must match color PR no. 6, Highway Orange, of the FHWA Color Tolerance Chart.

The interface between the rail surface and the retroreflective sheeting must be free of air bubbles or voids.

The predominant color of barricade components other than the rails must be white or unpainted galvanized metal or aluminum.

You may use a Type III barricade as a sign support if the barricade has been successfully crash tested under *NCHRP Report 350* criteria or the Manual for Assessing Safety Hardware (MASH) crash testing guidelines as a single unit with an attached sign panel of the size and type to be used.

A sign panel for a construction area sign or marker panel to be mounted on a barricade must comply with section 12-3.11B(2).

Do not imprint an owner identification on the retroreflective face of any rail.

12-3.10C Construction

Place each barricade such that the stripes slope downward in the direction road users are to pass.

Place each sand-filled bag near the ground level on the lower parts of the frame or stays to serve as ballast for the barricades. Do not place ballast on top of barricades or over any retroreflective barricade rail face that is facing traffic.

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TEMPORARY TRAFFIC CONTROL

Do not remove barricades that are shown to be left in place at the time of work completion.

Moving a barricade from location to location is change order work if ordered after initial placement of the barricade.

12-3.10D Payment

Not Used

12-3.11 CONSTRUCTION AREA SIGNS

12-3.11A General

12-3.11A(1) Summary

Section 12-3.11 includes specifications for placing construction area signs.

Construction area signs include all temporary signs and object markers required for the direction of traffic through or within the project limits and general information signs, including project funding signs.

12-3.11A(2) Definitions

background: Dominant sign color.

legend: Letters, numerals, tildes, bars, arrows, route shields, symbols, logos, borders, artwork, and miscellaneous characters that are intended to convey specific meanings on traffic signs.

12-3.11A(3) Submittals

Reserved

12-3.11A(4) Quality Assurance

Reserved

12-3.11B Materials

12-3.11B(1) General

A construction area sign must be the product of a commercial sign manufacturer and have Type III or higher grade retroreflective sheeting.

The style, font, size, and spacing of the legend must comply with the *Standard Alphabets* published in the FHWA's Standard Highway Signs Book.

The sign must be visible from 500 feet and legible from 300 feet at noon on a cloudless day and during the hours of darkness under an illumination of legal low-beam headlights by persons with 20/20 vision or vision corrected to 20/20. A fabric sign panel on a portable sign is not subject to the visibility and legibility requirements for headlight illumination during the hours of darkness.

A construction area warning or guide sign must have a black legend on a retroreflective, orange background. A W10-1 advance warning sign for highway-rail grade crossings must have a black legend on a retroreflective yellow background.

12-3.11B(2) Stationary-Mounted Signs

Materials for a stationary-mounted sign must comply with section 82-2 for the type of panel involved.

A temporary sign support of any type placed within 15 feet from the edge of the traveled way must comply with the specifications for a Category 2 temporary traffic control device.

The sign post must be good, sound wood posts with the breakaway feature as shown for a roadside sign.

Fastening hardware and back braces must be commercial-quality materials.

12-3.11B(3) Portable Signs

Each portable sign must consist of a base, standard or framework, and a sign panel. Units delivered to the job site must be capable of being placed into immediate operation.

A sign panel for a portable sign must comply with the specifications for a stationary-mounted sign panel or be fabricated from one of the following materials:

1. Type VI, retroreflective, elastomeric roll-up fabric on the Authorized Material List for signing and delineation materials
2. Nonretroreflective, cotton, drill fabric
3. Nonretroreflective, flexible, industrial, nylon fabric
4. Another type of fabric if authorized

Do not use nonretroreflective portable signs during the hours of darkness.

The bottom of the portable sign panel must be at least 1 foot above the edge of the traveled way.

12-3.11B(4) Temporary Object Markers

A temporary object marker must be mounted on a stationary wood or metal post and must comply with section 82.

A marker panel for a Type N (CA), Type P (CA), or Type R (CA) object marker must comply with the specifications for a marker panel for a stationary sign panel in section 12-3.11B(2).

A target plate, post, and the hardware for a Type K (CA) and Type L (CA) temporary object marker must comply with the specifications for these items in section 82.

12-3.11B(5) General Information Signs

Reserved

12-3.11C Construction

12-3.11C(1) General

Place all construction area signs outside of the traveled way at locations approved by the Engineer. Do not block a bicycle or pedestrian pathway, a driveway or windows with a construction area sign. Construction area signs to be installed in front of private property must be installed between properties, at the property line, and as close as possible to the back of sidewalk or walkway.

Place, install, maintain, and remove temporary object markers shown as construction area signs as specified for construction area signs.

Maintain accurate information on construction area signs. Immediately replace or correct signs that convey inaccurate information.

During the progress of work, immediately cover or remove unneeded signs.

Cover each unneeded sign such that the message cannot be seen. Securely fasten the cover to prevent movement from wind.

Check each covered sign daily for damage to the cover and immediately replace any cover if needed.

Clean each construction area sign panel at the time of installation and at least once every 4 months thereafter.

Be prepared to furnish additional construction area sign panels, posts, and mounting hardware or portable sign mounts on short notice due to changing traffic conditions or damage caused by traffic or other conditions. Maintain an inventory of commonly required items at the job site or make arrangements with a supplier who is able to furnish the items daily on short notice.

Replace any damaged construction area sign or repair the sign if authorized.

Remove any sign panel that exhibits irregular luminance, shadowing, or dark blotches at nighttime under vehicular headlight illumination.

12-3.11C(2) Stationary-Mounted Signs

Install stationary-mounted signs as described for the installation of roadside signs except:

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TEMPORARY TRAFFIC CONTROL

1. Back braces and blocks for sign panels are not required for signs 48 inches or smaller in width and diamond-shaped signs 48 by 48 inches or smaller.
2. Bottom of the sign panel must be at least 7 feet above the edge of the traveled way.
3. You may install a construction area sign on an above-ground, temporary platform sign support or on an existing lighting standard or other support if authorized. Do not make holes in a standard to support the sign if it is installed on an existing lighting standard.
4. Post embedment must be at least 2.5 feet if the post hole is backfilled around the post with commercial-quality concrete. The concrete must contain at least 295 pounds of cementitious material per cubic yard.

The Engineer determines the post size and number of posts if the type of sign installation is not shown.

Excavate each post hole by hand methods without the use of power equipment. You may use power equipment where you determine that subsurface utilities are not present in the area of the proposed post hole if authorized. The post-hole diameter must be at least 4 inches greater than the longest cross-sectional dimension of the post if it is backfilled with commercial-quality concrete.

Furnishing, installing, maintaining, moving, and removing any additional construction area signs if ordered is change order work.

12-3.11C(3) General Information Signs

Reserved

12-3.11D Payment

Not Used

12-3.12 TELESCOPING FLAG TREES

12-3.12A General

Section 12-3.12 includes specifications for placing telescoping flag trees.

12-3.12B Materials

Telescoping flag trees must be manufactured from commercial-quality material designed for the intended purpose and capable of maintaining an upright position at all times while in use.

12-3.12C Construction

Not Used

12-3.12D Payment

Not Used

12-3.13–12-3.19 RESERVED

12-3.20 TYPE K TEMPORARY RAILING

12-3.20A General

12-3.20A(1) Summary

Section 12-3.20 includes specifications for placing Type K temporary railing and Type K temporary terminal sections.

Type K temporary railing must consist of interconnected PC concrete barrier panels.

You may have your name or logo on each panel of Type K temporary railing. The name or logo must not be more than 4 inches in height and must be located not more than 12 inches above the bottom of the rail panel.

Reinforcing steel must comply with section 52.

12-3.20A(2) Definitions

Reserved

12-3.20A(3) Submittals

Submit a certificate of compliance for Type K temporary railing not cast at the job site.

12-3.20A(4) Quality Assurance

Reserved

12-3.20B Materials**12-3.20B(1) General**

Concrete must comply with the specifications for minor concrete except load tickets and a certificate of compliance are not required.

Steel bars to receive bolts at the ends of the concrete panels must comply with ASTM A36/A36M. The bolts must comply with ASTM A307.

You may substitute a round bar of the same diameter for the end-connecting bolt shown. If a round bar is used, the round bar must:

1. Comply with ASTM A36/A36M
2. Have a minimum length of 26 inches
3. Have a 3-inch-diameter, 3/8-inch-thick plate welded on the upper end using a 3/16-inch fillet weld

The final surface finish of the railing must comply with section 51-1.03F(2).

Cure the exposed surfaces of the railing by the water method, the forms-in-place method, or the curing compound method using curing compound no. 1.

12-3.20B(2) Type K Temporary Terminal Section

The closure plate for a Type K temporary terminal section must be a white, commercial-quality steel plate shaped to conform to the cross section of the barrier. The mechanical expansion anchors for connecting the closure plate to the railings must comply with section 75-3 for concrete anchorage devices.

12-3.20C Construction**12-3.20C(1) General**

Before placing Type K temporary railing on the job site, paint the exposed surfaces of the railing with white paint complying with the specifications for acrylic emulsion paint for exterior masonry. The repainting of the units is change order work if it is ordered after the units are in place.

Place Type K temporary railing on a firm, stable foundation. Grade the foundation to provide a uniform bearing surface throughout the entire length of the railing.

Structure excavation and backfill must comply with section 19-3 except compaction of earth fill placed behind Type K temporary railing in a curved layout is not required.

Place and maintain the abutting ends of PC concrete units in alignment without substantial offset from each other.

The drilling of holes and bonding of threaded rods or dowels must comply with the specifications for drilling and bonding dowels in section 51-1.

Install a reflector on the top or face of the rail of each rail unit placed within 10 feet of a traffic lane. Apply adhesive for mounting the reflector under the reflector manufacturer's instructions.

Install a Type P marker panel at each end of railing placed adjacent to a 2-lane, two-way highway and at the end facing traffic for railing installed adjacent to a one-way roadbed. If the railing is placed on a skew, install the marker at the end of the skew nearest the traveled way. Type P marker panels must comply with section 82 except you must furnish the marker panels.

After removing Type K temporary railing:

1. Restore the area to its previous condition or construct it to its planned condition if temporary excavation or embankment was used to accommodate the railing.

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2. Remove all threaded rods or dowels to a depth of at least 1 inch below the surface of the concrete. Fill the resulting holes with mortar under section 51-1 except cure the mortar by the water method or by the curing compound method using curing compound no. 6.

If the Engineer orders a lateral move of Type K temporary railing and repositioning is not shown, the lateral move is change order work and the railing is not measured in the new position.

12-3.20C(2) Type K Temporary Terminal Section

When the Type K temporary terminal section is no longer required, remove the anchor bolts connecting the closure plate to the concrete barrier or cut the bolts flush with the face of the barrier. If the anchor bolts are removed, fill the holes with grout.

12-3.20D Payment

The payment quantity for temporary railing (Type K) is the length measured along the top of the railing.

12-3.21 TEMPORARY TRAFFIC SCREENS

12-3.21A General

Section 12-3.21 includes specifications for installing temporary traffic screens.

12-3.21B Materials

Temporary traffic screen panels must be one of the following:

1. CDX grade or better plywood
2. Weather-resistant strand board
3. Plastic

Plastic temporary traffic screen panels must be on the Authorized Material List for temporary traffic screen.

Wale boards for use with plywood or strand board must be Douglas fir, rough sawn, construction grade or better.

Pipe screen supports must be schedule 40, galvanized steel pipe.

Nuts, bolts, and washers must be cadmium plated.

Screws must be black or cadmium-plated flat head, cross-slotted, with full-thread length.

Temporary traffic screen panels must be CDX grade or better, plywood or weather-resistant strand board.

Wale boards must be Douglas fir, rough sawn, construction grade or better.

Pipe screen supports must be schedule 40, galvanized steel pipe.

Nuts, bolts, and washers must be cadmium plated.

Screws must be black or cadmium-plated flat head, cross-slotted screws with full-thread length.

12-3.21C Construction

Install and anchor temporary traffic screens to the top of the Type K temporary railing. The temporary traffic screen must have 3-foot-long openings spaced at 200-foot intervals.

A lateral move of Type K temporary railing with attached temporary traffic screen is change order work if ordered and repositioning is not shown.

12-3.21D Payment

The payment quantity for temporary traffic screen is the length measured along the line of the screen with no deductions for openings in the temporary traffic screen.

12-3.22 TEMPORARY CRASH CUSHION MODULES**12-3.22A General**

Section 12-3.22 includes specifications for placing sand-filled temporary crash cushion modules in groupings or arrays.

If activities expose traffic to a fixed obstacle, protect the traffic from the obstacle with a sand-filled temporary crash cushion. The crash cushion must be in place before opening traffic lanes adjacent to the obstacle.

12-3.22B Materials

Each sand-filled temporary crash cushion module must be manufactured after March 31, 1997 and be on the Authorized Material List for highway safety features.

The color of each module must be standard yellow with black lids as furnished by the manufacturer. Each module must be free from structural flaws and objectionable surface defects.

For a module requiring a seal, the top edge of the seal must be securely fastened to the wall of the module by a continuous strip of heavy-duty tape.

Fill each module with sand under the manufacturer's instructions and to the sand capacity in pounds for each module shown. Sand for filling the modules must be clean, commercial-quality, washed concrete sand. When sand is placed in a module, the sand must contain no more than 7 percent water when tested under California Test 226.

12-3.22C Construction

Use the same type of crash cushion module for a single grouping or array.

Temporary crash cushion arrays must not encroach on the traveled way.

Secure the sand-filled modules in place before starting an activity requiring a temporary crash cushion.

Maintain sand-filled temporary crash cushions in place at each location, including times when work is not actively in progress. You may remove the crash cushions during the work shift for access to the work if the exposed fixed obstacle is 15 feet or more from the nearest lane carrying traffic. Reset the crash cushion before the end of the work shift.

Immediately repair sand-filled temporary crash cushion modules damaged due to your activities. Remove and replace any module damaged beyond repair. Repair and replacement of temporary crash cushion modules damaged by traffic are change order work.

You may place sand-filled temporary crash cushion modules on movable pallets or frames complying with the dimensions shown. The pallets or frames must provide a full-bearing base beneath the modules. Do not move the modules and supporting pallets or frames by sliding or skidding along the pavement or bridge deck.

Attach a Type R or Type P marker panel to the front of the temporary crash cushion if the closest point of the crash cushion array is within 12 feet of the traveled way. Firmly fasten the marker panel to the crash cushion with commercial quality hardware or by other authorized methods. Attach the Type R marker panel such that the top of the panel is 1 inch below the module lid. Attach the Type P marker panel such that the bottom of the panel rests upon the pallet or roadway surface if pallets are not used.

A lateral move of a temporary crash cushion module is change order work if ordered and the repositioning is not shown.

Remove sand-filled temporary crash cushion modules, including sand, pallets or frames, and marker panels, at Contract acceptance. Do not install sand-filled temporary crash cushion modules in the permanent work.

12-3.22D Payment

The payment quantity for temporary crash cushion module does not include:

SECTION 12

TEMPORARY TRAFFIC CONTROL

1. Modules placed for public safety
2. Modules placed in excess of the number described
3. Repositioned modules

12-3.23 IMPACT ATTENUATOR VEHICLES

Not Used

12-3.24–12-3.29 RESERVED

12-3.30 FLASHING ARROW SIGNS

Not Used

12-3.31 PORTABLE FLASHING BEACONS

Not Used

12-3.32 PORTABLE CHANGEABLE MESSAGE SIGNS

Not Used

12-3.33 PORTABLE SIGNAL SYSTEMS

Not Used

12-3.34 TEMPORARY FLASHING BEACON SYSTEMS

Not Used

12-3.35 AUTOMATED WORK ZONE INFORMATION SYSTEMS

Not Used

12-3.36 PORTABLE TRANSVERSE RUMBLE STRIPS

Not Used

12-3.37 PORTABLE RADAR SPEED FEEDBACK SIGN SYSTEMS

Not Used

12-3.38 AUTOMATED FLAGGER ASSISTANCE DEVICES

Not Used

12-3.39–12-3.40 RESERVED

12-4 MAINTAINING TRAFFIC

12-4.01 GENERAL

12-4.01A General

Section 12-4.01 includes general specifications for maintaining traffic through construction work zones.

If local authorities regulate traffic, notify them at least 5 business days before the start of job site activities. Cooperate with the local authorities to handle traffic through the work zone and to make arrangements to keep the work zone clear of parked vehicles.

12-4.01A(1) Traffic Control Plan

Submit a traffic control plan, wet stamped by either a registered civil engineer or traffic engineer, for approval prior to issuance of the Notice to Proceed.

12-4.01A(2) Responsibility

You are fully responsible for accidents to the public and damages to public and private property on the site of the work, and at fences, barriers and other traffic control devices that you install.

12-4.01A(3) Use of Non-Public Right-of-Way

Make all arrangements with property owners for use of private land for detours and for any other purpose and indemnify the County/District from any liability incurred through the use or nonuse of such property. Comply with section 7-1.05, "Indemnification."

12-4.01A(4) Access to Properties

Ensure compliance with section 7-1.03, “Public Convenience.”

Provide for through traffic and for ingress to and egress from all private property adjacent to the work; however, at times when the quality of workmanship can be improved and a better job obtained by the elimination of the through traffic, such traffic may, upon the approval of the Engineer, be temporarily diverted to other routes.

Give special attention to providing continuous and uninterrupted traffic to and from all schools and businesses adjacent to the work. Schedule and pursue operations in such a manner that undesirable construction conditions will be minimized.

Maintain private entrances and construct such detours as may be necessary to properly conduct the work and to provide entrances to private property at all times.

12-4.01A(5) Timeframe for Work that Interferes with Traffic

Work that interferes with traffic must not begin before 8:30 a.m. or continue after 5:00 p.m., except work required under sections 7-1.03, “Public Convenience” and 7-1.04, “Public Safety.”

12-4.01A(6) Open Traffic Lane Requirements

A minimum of one paved traffic lane, not less than 12 feet wide, must be open for use by public traffic. Not less than two such lanes must be open to public traffic when construction operations are not actively in progress.

12-4.01A(7) Notification Letter

Prepare and distribute a notification letter to all residents, school officials, and business entities at least 72 hours prior to any work. This letter must be reviewed by the Engineer prior to distribution. Coordinate with school officials to minimize any disruption to school activities and to maintain accessibility to the schools within the proximity of the construction areas where overlaying operations will be performed. A sample letter is included as part of the Information Handouts.

12-4.01A(8) No Parking

Post temporary NO PARKING signs (sample in Information Handout J) 72 hours prior to working on roadways. On these signs, specify the day work will occur on the roadway. If you cannot work on the posted date, remove the signs and re-post them 72 hours prior to the new work day.

Consecutive time periods of parking restrictions on each roadway for overlay must be limited to no more than the following:

- 1 - 10 hour period for base repair
- 1 - 10 hour period for keycutting or milling
- 1 - 10 hour period for paving operations

No two adjacent roadways can be closed or have parking restricted on the same day. Immediately re-post/re-date no parking signs and barricades for any revisions of schedule including changes caused by inclement weather. Immediately remove these upon expiration of the dated work.

12-4.01A(9) End of Day Tasks

At the end of each working day, install temporary raised reflective markers, temporary pavement markings, and temporary crosswalks to replace existing striping and markings that have been removed by keycutting, base repair, excavation or intermediate layers of asphalt concrete.

Ensure compliance with section 10-1.02E, “Excavation,” which requires tapered transitions at vertical offsets at the end of the working day.

12-4.01B Materials

Not Used

12-4.01C Construction

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SECTION 12

TEMPORARY TRAFFIC CONTROL

Not Used

12-4.01D Payment

Not Used

12-4.02 TRAFFIC CONTROL SYSTEMS

12-4.02A General

12-4.02A(1) Summary

Section 12-4.02 includes specifications for providing a traffic control system to close traffic lanes, shoulders, ramps, and connectors.

A traffic control system for a closure includes the temporary traffic control devices described as part of the traffic control system. Temporary traffic control devices must comply with section 12-3.

12-4.02A(2) Definitions

Construction Zone Enhanced Enforcement Program (COZEEP): Program that provides California Highway Patrol officers to monitor the movement of traffic within the work zone.

designated holidays: Designated holidays are shown under section 1-1.07, "Definitions" in the following table:

If a designated holiday falls on a Sunday, the following Monday is a designated holiday. If November 11th falls on a Saturday, the preceding Friday is a designated holiday.

12-4.02A(3) Submittals

12-4.02A(3)(a) General

Submit a request for a minor deviation from the specified work hours. ~~For a project in District 7, submit the request at least 15 days before the proposed closure date.~~ Your request may be authorized if (1) the Agency does not accrue a significant cost increase and (2) the work can be expedited and better serve the traffic.

If a closure is not opened to traffic by the specified time, submit a work plan that ensures that future closures will be opened to traffic by the specified time. Allow 2 business days for review.

Submit closure schedule requests and closure schedule amendments ~~using LCS~~ to show the locations and times of the requested closures.

Submit a traffic break request ~~using LCS~~ to show the location and time of the requested traffic break.

12-4.02A(3)(b) Closure Schedules

Every Monday by noon, submit a closure schedule request for planned closures for the next week.

~~Except for a project in District 7, the~~ The next week is defined as Sunday at noon through the following Sunday at noon.

~~For a project in District 7, the next week is defined as Friday at noon through the following Friday at noon.~~

Submit a closure schedule request from 25 days to 125 days before the anticipated start of any job site activity that reduces:

1. Horizontal clearances of traveled ways, including shoulders, to 2 lanes or fewer due to activities such as temporary barrier placement and paving
2. Vertical clearances of traveled ways, including shoulders, due to activities such as pavement overlays, overhead sign installation, or falsework girder erection

Submit closure schedule changes, including additional closures, by noon at least 3 business days before a planned closure.

Cancel closure requests ~~using LCS~~ at least 48 hours before the start time of the closure.

The Agency notifies you ~~through LCS~~ of authorized and unauthorized closures and closures that require coordination with other parties as a condition for authorization.

12-4.02A(3)(c) Contingency Plans for Closures

Submit a contingency plan for an activity that could affect a closure if ~~a contingency plan is specified in the special provisions or if~~ a contingency plan is requested.

If a contingency plan is requested, submit the contingency plan within 1 business day of the request.

The contingency plan must identify the activities, equipment, processes, and materials that may cause a delay in the opening of a closure to traffic. The plan must include:

1. List of additional or alternate equipment, materials, or workers necessary to ensure continuing activities and on-time opening of closures if a problem occurs. If the additional or alternate equipment, materials, or workers are not on the job site, specify their location, the method for mobilizing these items, and the required time to complete mobilization.
2. General time-scaled logic diagram displaying the major activities and sequence of the planned activities. For each activity, identify the critical event that will activate the contingency plan.

Submit revisions to a contingency plan at least 3 business days before starting the activity requiring the contingency plan. Allow 2 business days for review.

12-4.02A(3)(d) Traffic Break Schedule

Every Monday by noon, submit a traffic break request for the next week. Support for a traffic break is based on local ~~California Highway Patrol~~ staffing levels and may not be available for the date or time requested.

Traffic break requests are limited to the hours when a shoulder or lane closure is allowed.

Cancel a traffic break request ~~using LCS~~ at least 48 hours before the start time of the traffic break.

The Agency notifies you ~~through LCS~~ of authorized and unauthorized traffic breaks.

The Agency does not adjust time or payment if (1) an ~~an California Highway Patrol~~ officer is unavailable for the requested date or time or (2) your request is not authorized.

12-4.02A(4) Quality Assurance

Reserved

12-4.02B Materials

Not Used

12-4.02C Construction

12-4.02C(1) General

Work that interferes with traffic is limited to the hours when closures are allowed.

Do not reduce an open traffic lane width to less than 10 feet. If traffic cones or delineators are used for temporary edge delineation, the side of the base of the cones or delineators nearest to traffic is considered the edge of the traveled way.

Do not simultaneously close consecutive ramps in the same direction of travel servicing 2 consecutive local streets unless authorized.

Notify the Engineer of delays in your activities caused by the denial of either (1) an authorized closure or (2) a closure schedule request for the specified time frame allowed for closures.

Discuss the contingency plan for any activity that could affect the closure schedule with the Engineer at least 5 business days before starting the activity requiring the plan.

If you do not open a closure to traffic by the specified time, suspend work and submit a work plan. No further closures are allowed until your work plan has been authorized.

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If the Engineer orders you to remove a closure before the time designated in the authorized closure schedule, any delay caused by this order is an excusable delay.

The Engineer may reschedule a closure that was canceled due to unsuitable weather.

You may use automated flagger assistance devices to enhance the traffic control system for a lane closure on a two-lane convention highway, except if a bid item for automated flagger assistance devices is shown in the Bid Item List, the use of AFADs is required.

Do not use automated flagger assistance devices:

1. On multi-lane highways
2. As a substitute or a replacement for a temporary traffic control signal
3. If the devices impair access for pedestrians and bicycles, unless alternate access is provided
4. If the usable shoulder area is not wide enough to place a trailer mounted device
5. If the distance between the devices is more than 800 feet, except when each device is controlled by a separate operator and radio communication is available between the AFAD operators

12-4.02C(2) Lane Closure System

Not Used

12-4.02C(3) Closure Requirements and Charts

12-4.02C(3)(a) General

Where 2 or more lanes in the same direction, including the shoulders, are adjacent to the area where the work is being performed, close the adjacent lane under any of the following conditions:

1. Work is off the traveled way but within 6 feet of the edge of the traveled way, and the approach speed is greater than 45 mph
2. Work is off the traveled way but within 3 feet of the edge of the traveled way, and the approach speed is less than 45 mph

Closure of the adjacent traffic lane is not required during any of the following activities:

1. Work behind a barrier
2. Paving, grinding, or grooving
3. Installation, maintenance, or removal of traffic control devices except for temporary railing

12-4.02C(3)(b) Complete Freeway or Expressway Closure Requirements

Reserved

12-4.02C(3)(c) HOV, Express, and Bus Lane Closure Requirements

Reserved

12-4.02C(3)(d) City/County Street Closure Requirements

During hauling and excavation operations, the road may be closed and public traffic stopped for periods of no more than 10 minutes. After each closure, allow all accumulated traffic to pass through the work area before another closure is made. All lanes are to be open at the end of the workday.

12-4.02C(3)(e) Closure Restrictions for Special Events and Venues

Reserved

12-4.02C(3)(f) Closure Restrictions for Designated Holidays and Special Days

Reserved

12-4.02C(3)(g) Freeway or Expressway Lane Requirement Charts

Reserved

12-4.02C(3)(h) Complete Freeway or Expressway Closure Hour Charts

Reserved

12-4.02C(3)(i) Complete Connector Closure Hour Charts and Connector Lane Requirement Charts

Reserved

12-4.02C(3)(j) Complete Ramp Closure Hour Charts and Ramp Lane Requirement Charts

Reserved

12-4.02C(3)(k) Conventional Highway Lane Requirement Charts

Reserved

12-4.02C(3)(l) Complete Conventional Highway Closure Hour Charts

Reserved

12-4.02C(3)(m) City Street Closure Hour Charts and City Street Lane Requirement Charts

Reserved

12-4.02C(3)(n) Concrete Slab and Approach Slab Replacement Closure Hours Table

Reserved

12-4.02C(3)(o)–12-4.02C(3)(s) Reserved**12-4.02C(4)–12-4.02C(6) Reserved****12-4.02C(7) Traffic Control System Requirements****12-4.02C(7)(a) General**

Control traffic using stationary closures.

If components of the traffic control system are displaced or cease to operate or function as specified, immediately repair them to their original condition or replace them and place them back in their original locations.

Vehicles equipped with attenuators must comply with section 12-3.23.

Each vehicle used to place, maintain, and remove components of a traffic control system on a multilane highway must have a Type II flashing arrow sign that must operate whenever the vehicle is used for placing, maintaining, or removing the components. For a stationary closure, vehicles with a Type II flashing arrow sign not involved in placing, maintaining, or removing the components must display only the caution display mode. If a flashing arrow sign is required for a closure, activate the sign before the closure is in place.

12-4.02C(7)(b) Stationary Closures

Except for channelizing devices placed along open trenches or excavations adjacent to the traveled way, remove the components of the traffic control system for a stationary closure from the traveled way and shoulders at the end of each work period. You may store the components at authorized locations within the limits of the [right of way highway](#).

If a traffic lane is closed with channelizing devices for excavation work, move the devices to the adjacent edge of the traveled way when not excavating. Space the devices as shown for the lane closure.

12-4.02C(7)(c) Moving Closures

For a moving closure, use a PCMS that complies with section 12-3.32 except the sign must be truck mounted. The full operational height to the bottom of the sign may be less than 7 feet above the ground but must be as high as practicable.

If you use a flashing arrow sign in a moving closure, the sign must be truck mounted. Operate the flashing arrow sign in the caution display mode if it is being used on a 2-lane, two-way highway.

12-4.02C(7)(d) Traffic Breaks**[Not Used](#)**

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SECTION 12

TEMPORARY TRAFFIC CONTROL

12-4.02C(8) Traffic Control System Signs

12-4.02C(8)(a) General

Traffic control system signs must comply with section 12-3.11.

12-4.02C(8)(b) Connector and Ramp Closure Signs

Not Used

12-4.02C(9)–12-4.02C(12) Reserved

12-4.02D Payment

The Agency pays for change order work for a traffic control system by force account for increased traffic control and uses a force account analysis for decreased traffic control.

The Agency does not pay for furnishing, placing, relocating, and removing PCMSs used for a traffic break.

~~The Department deducts the full cost of COZEEP support provided for the traffic break.~~

~~The hourly rate for each California Highway Patrol officer providing COZEEP support is \$115. This rate includes full compensation for each hour or portion thereof that the officer provides the support. Markups are not added to any expenses associated with COZEEP support.~~

~~The minimum number of hours for an officer is 4 hours, except if a closure is already in place and the Engineer authorizes your request for an on-duty officer to conduct a traffic break, the minimum number of hours for an officer is 1 hour.~~

~~For a cancellation less than 48 hours before the scheduled start time of COZEEP support, except for cancellation due to adverse weather or extenuating circumstances, the Department deducts:~~

- ~~1. Minimum of \$50 per California Highway Patrol officer if the officer is notified before the start time~~
- ~~2. Maximum of 4 hours of pay per officer if the officer is not notified before the start time~~

12-4.03 FALSEWORK OPENINGS

Reserved

12-4.04 TEMPORARY PEDESTRIAN ACCESS ROUTES

12-4.04A General

12-4.04A(1) Summary

Section 12-4.04 includes specifications for providing, maintaining, and removing temporary pedestrian access routes.

Pedestrian travel must be maintained at all times along both sides of the street (or streets) under construction.

In all cases, pedestrian walkways shall be separated from vehicular travel by a clear area of at least 6 feet, or in locations where the 6 feet of horizontal separation of pedestrian traffic is not feasible, by raised curb, a raised wooden walkway with standard railings, or by K rails. This condition may be modified or waived by the Engineer upon written request.

Provide access to pedestrian push buttons at all times.

A temporary pedestrian access route includes temporary traffic control devices as shown except for Type K temporary railing and temporary crash cushions.

12-4.04A(2) Definitions

Reserved

12-4.04A(3) Submittals

If work activities require the closure of a pedestrian route and a temporary pedestrian access route is not shown, submit a work plan for a temporary pedestrian access route. The work plan must:

1. Describe the activities, processes, equipment, and materials that will be used to provide the temporary access route
2. Show the locations of the routes and the placement of traffic control devices for each stage of work
3. Include a time-scaled logic diagram displaying the sequence and duration of the planned activities for each stage of work
4. Be sealed and signed by an engineer who is registered as a civil engineer in the State

Submit "Temporary Pedestrian Access Route Contractor Compliance Report," within 2 business days after construction of a temporary pedestrian access route.

Submit "Temporary Pedestrian Access Route Contractor Weekly Report," within 2 business days of completing a weekly inspection.

12-4.04A(4) Quality Assurance**12-4.04A(4)(a) General**

Reserved

12-4.04A(4)(b) Quality Control

Perform a review of the temporary pedestrian access route after it is constructed and document compliance on the "Temporary Pedestrian Access Route Contractor Compliance Report."

The Agency will conduct a verification inspection after receiving the compliance report.

For a temporary pedestrian access route in use perform a weekly review and document compliance on the "Temporary Pedestrian Access Route Contractor Weekly Report."

12-4.04B Materials

The walkway surface must be slip resistant and surfaced with minor HMA or commercial-quality, bituminous material, commercial-quality concrete, or wood.

A handrail with a circular cross section must have an outer diameter from 1-1/4 to 2 inches. A handrail with a noncircular cross section must have a perimeter from 4 to 6-1/4 inches and a maximum cross-section dimension of 2-1/4 inches.

Fasteners must be rounded to prevent injury to a pedestrian's fingers, hands, and arms and to eliminate sharp edges that could catch on clothing.

A detectable warning surface must be on the Authorized Material List for detectable warning surfaces and match yellow color no. 33538 of FED-STD-595.

Temporary traffic control devices used to channelize pedestrians must:

1. Be free of sharp or rough edges
2. Have a continuous detectable edging at least 6 inches high and at no more than 2 inches above the walkway surface
3. Be at least 32 inches in height
4. Have smooth connection points between devices to allow for a handrail
5. Have a top and bottom surface in the same vertical plane

12-4.04C Construction

Notify the Engineer 5 business days before closing an existing pedestrian route. Do not close the route until authorized.

If work activities require the closure of a pedestrian route and a temporary pedestrian access route is not shown, provide a temporary pedestrian access route near the traveled way. You may route pedestrians using the existing sidewalk or by constructing a temporary access route.

SECTION 12

TEMPORARY TRAFFIC CONTROL

If a bid item for a temporary pedestrian access route is not shown on the Bid Item List, then constructing a temporary pedestrian access route is change order work except, when the closure is a result of your means and methods.

Construct a temporary pedestrian access route such that:

1. Walkway surface is firm and stable and free of irregularities
2. Cross slope of the pedestrian route is at most 50:1 (horizontal:vertical)
3. Longitudinal slope of the pedestrian route is at most 20:1 (horizontal:vertical)
4. Walkway, landings, blended transitions, and curb ramps are at least 60 inches wide except where not feasible, the width must be at least 48 inches wide with a 60-by-60-inch passing space at least every 200 feet
5. Lateral joints or gaps between surfaces are less than 1/2 inch wide
6. Discontinuities in surface heights are less than 1/2 inch and beveled if greater than 1/4 inch with a slope no greater than 2:1 (horizontal:vertical)
7. Ramps have:
 - 7.1. Longitudinal slope of at most 12:1 (horizontal:vertical)
 - 7.2. Rise less than 30 inches
 - 7.3. Protective edging at least 2 inches high on each side and handrails at a height from 34 to 38 inches above the walkway surface if the rise is greater than 6 inches
8. Curb ramps have:
 - 8.1. Longitudinal slope of at most 12:1 (horizontal:vertical)
 - 8.2. Protective edging at least 2 inches high on each side if the curb ramp does not have flares and the rise is greater than 6 inches
9. Pedestrians are channelized when routed off existing pedestrian routes

Construct handrails such that they are continuous, smooth and free of sharp or rough edges.

Provide an overhead covering to protect pedestrians from falling objects and drippings from overhead structures.

If the temporary access route is next to traffic or work activities, place a temporary barrier to separate the route from vehicles and equipment.

Install a detectable warning surface at locations where a curb ramp, landing, or blended transition connects to a street. Install the warning surface such that it extends a minimum of 36 inches in the direction of travel and for the full width of the landing, blended transition, or curb ramp, excluding the flares.

Maintain the temporary pedestrian access route clear of obstructions. Do not allow traffic control devices, equipment, or construction materials to protrude into the walkway. Maintain a continuous unobstructed path connecting all pedestrian routes, parking lots, and bus stops located within the project limits.

Remove the temporary pedestrian access route when the Engineer determines it is no longer needed.

Provide a temporary pedestrian access route through falsework under section 16-2.02.

12-4.04D Payment

Not Used

12-4.05 BRIDGE CLEANING AND PAINTING ACTIVITIES

Not Used

12-4.06 TOLL BRIDGES

Not Used

12-4.07–12-4.10 RESERVED**12-5 RESERVED****12-6 TEMPORARY PAVEMENT DELINEATION****12-6.01 GENERAL**

Section 12-6 includes specifications for placing temporary pavement delineation except for delineation on a seal coat project.

Temporary painted traffic stripes and painted pavement markings used for temporary delineation must comply with section 84-2.

Temporary signs for no-passing zones must comply with section 12-3.11.

12-6.02 MATERIALS**12-6.02A General**

The following types of temporary pavement delineation must be on the Authorized Material List for signing and delineation materials:

1. Temporary pavement markers for long term day/night use (180 days or less)
2. Temporary pavement markers for short term day/night use (14 days or less)
3. Temporary (removable) striping and pavement marking tape (180 days or less)
4. Permanent traffic striping and pavement marking tape
5. Channelizers

12-6.02B Temporary Pavement Markers

Temporary pavement markers must be the same color as the lane line or centerline markers being replaced.

Temporary pavement markers must be for long-term day or night use, 180 days or less, except you may use temporary pavement markers for short-term day or night use, 14 days or less, if you place the permanent pavement delineation before the end of the 14 days.

12-6.02C Channelizers

Channelizers used for temporary edge line delineation must be orange and surface mounted.

12-6.03 CONSTRUCTION**12-6.03A General**

If work activities obliterate pavement delineation, place temporary or permanent pavement delineation before opening the traveled way to traffic. The temporary pavement delineation must consist of a lane line and centerline pavement delineation for traveled ways open to traffic. On multilane roadways, freeways, expressways, and 2-lane roadways with shoulders 4 feet or more in width, the temporary pavement delineation must also include edge line delineation for traveled ways open to traffic.

Establish the alignment for temporary pavement delineation, including the required lines or markers. Surfaces to receive an application of paint or removable traffic tape must be dry and free from dirt and loose material. Do not apply temporary pavement delineation over existing pavement delineation or any other temporary pavement delineation. Maintain temporary pavement delineation until no longer needed or replace it with a new striping detail of temporary or permanent pavement delineation.

When the Engineer determines the temporary pavement delineation is no longer required for the direction of traffic, remove the temporary pavement delineation, including any underlying adhesive for temporary pavement markers, from the final layer of surfacing and from the pavement to remain in place. Remove temporary pavement delineation that conflicts with any subsequent or new traffic pattern for the area.

12-6.03B Temporary Lane Line and Centerline Delineation

If lane lines or centerlines are obliterated and temporary pavement delineation to replace the lines is not shown, the minimum lane line and centerline delineation must consist of temporary pavement markers placed longitudinally at 24-foot maximum intervals.

For temporary lane line or centerline delineation consisting entirely of temporary pavement markers for short-term day or night use, 14 days or less, do not use the markers for more than 14 days on lanes opened to traffic. Place the permanent pavement delineation before the end of the 14 days. If the permanent pavement delineation is not placed within 14 days, replace the temporary pavement markers with additional temporary pavement delineation equivalent to the pattern described for the permanent pavement delineation for the area.

If no-passing centerline pavement delineation is obliterated, install the following temporary no-passing zone signs before opening lanes to traffic:

1. W20-1 (Road Work Ahead) sign from 1,000 to 2,000 feet in advance of the no-passing zone
2. R4-1 (Do Not Pass) sign at the beginning of the no-passing zone and at 2,000-foot maximum intervals within the no-passing zone
3. W7-3a (Next ____ Miles) plaque beneath the W20-1 sign for continuous zones longer than 2 miles
4. R4-2 (Pass With Care) sign at the end of the no-passing zone

The Engineer determines the exact location of temporary no-passing zone signs. Maintain the temporary no-passing zone signs in place until you place the permanent no-passing centerline pavement delineation.

Remove the temporary no-passing zone signs when the Engineer determines they are no longer required for the direction of traffic.

12-6.03C Temporary Edge Line Delineation

On multilane roadways, freeways, expressways, and 2-lane roadways with shoulders 4 feet or more in width open to traffic where edge lines are obliterated and temporary pavement delineation to replace those edge lines is not shown, provide temporary pavement delineation for:

1. Right edge lines consisting of any of the following:
 - 1.1. Solid 6-inch-wide traffic stripe tape of the same color as the stripe being replaced
 - 1.2. Traffic cones placed longitudinally at 100-foot maximum intervals
 - 1.3. Portable delineators or channelizers placed longitudinally at 100-foot maximum intervals
2. Left edge lines consisting of any of the following:
 - 2.1. Solid 6-inch-wide traffic stripe tape of the same color as the stripe being replaced
 - 2.2. Traffic cones placed longitudinally at 100-foot maximum intervals
 - 2.3. Portable delineators or channelizers placed longitudinally at 100-foot maximum intervals
 - 2.4. Temporary pavement markers placed longitudinally at 6-foot maximum intervals

You may apply temporary traffic stripe paint of the same color as the stripe being replaced instead of solid 6-inch-wide temporary traffic stripe tape where the removal of the temporary traffic stripe is not required.

The Engineer determines the lateral offset for traffic cones, portable delineators, and channelizers used for temporary edge line delineation. If traffic cones or portable delineators are used for temporary edge line delineation, maintain the cones or delineators during the hours of the day when they are in use.

Cement the bases of channelizers used for temporary edge line delineation to the pavement with hot melt bituminous adhesive as specified in section 81-3 for cementing pavement markers to pavement.

12-6.03D Temporary Traffic Stripe, Pavement Marking, and Pavement Markers

12-6.03D(1) General

Reserved

12-6.03D(2) Temporary Traffic Stripe Tape

Except where the temporary traffic stripe is used for 14 days or less, apply temporary removable traffic stripe tape under the manufacturer's instructions and as follows:

1. Slowly roll the tape with a rubber-tired vehicle or roller to ensure complete contact with the pavement surface.
2. Apply the tape straight on a tangent alignment and on a true arc on a curved alignment.

3. Do not apply the tape when the ambient air or pavement temperature is less than 50 degrees F unless otherwise authorized.

For temporary traffic stripe tape used for 14 days or less, apply the temporary removable traffic stripe tape under the manufacturer's instructions.

12-6.03D(3) Temporary Traffic Stripe Paint

Apply temporary traffic stripe paint under section 84-2.03 except you may apply 1 or 2 coats of the temporary traffic stripe paint for new or existing pavement.

You are not required to remove painted temporary traffic stripe that will be covered by paving work.

12-6.03D(4) Temporary Pavement Marking Tape

Apply temporary removable pavement marking tape as specified for applying temporary removable traffic stripe tape in section 12-6.03D(2).

12-6.03D(5) Temporary Pavement Marking Paint

Apply temporary pavement marking paint under section 84-2.03 except you may apply 1 or 2 coats of the temporary pavement marking paint.

You are not required to remove of painted temporary pavement markings that will be covered by paving work.

You may use permanent or temporary removable pavement marking tape instead of temporary pavement marking paint.

12-6.03D(6) Temporary Pavement Markers

Place temporary pavement markers under the manufacturer's instructions. Cement temporary markers to the surfacing with the manufacturer's recommended adhesive except do not use epoxy adhesive in areas where the removal of the pavement markers is required.

You may use retroreflective pavement markers instead of temporary pavement markers for long-term day or night use, 180 days or less, except to simulate patterns of broken traffic stripe. Retroreflective pavement markers used for temporary pavement markers must comply with section 81-3 except the waiting period before placing pavement markers on new asphalt concrete surfacing as specified in section 81-3.03 does not apply. Do not use epoxy adhesive to place pavement markers in areas where the removal of the pavement markers is required.

12-6.04 PAYMENT

~~The Agency does not pay for additional temporary pavement delineation used to replace temporary pavement markers.~~

~~Temporary traffic stripe is measured as specified for traffic stripe in section 84.~~

~~Temporary pavement marking is measured as specified for pavement marking in section 84.~~

~~No separate payment is made for finishing, placing, maintaining and removing temporary pavement delineation, regardless of the number of times it has to be performed for the duration of the project.~~

12-7 TEMPORARY PAVEMENT DELINEATION FOR SEAL COATS

Not Used

12-8-12-10 RESERVED

13 WATER POLLUTION CONTROL

13-1 GENERAL

13-1.01 GENERAL

13-1.01A Summary

Section 13-1 includes general specifications for preventing, controlling, and abating water pollution within waters of the State.

For the purpose of identifying compliance level under the Construction General Permit, projects are classified as one of five types:

1. CGP Exempt
2. Erosivity Waiver Qualified
3. Risk Level 1
4. Risk Level 2
5. Risk Level 3

The project classification for this Contract is identified by the bid item involved.

For projects classified as CGP Exempt or Erosivity Waiver Qualified:

1. Prepare a Water Pollution Control Program under section 13-2
2. Job site activities cannot start until a WPCP is authorized

For projects classified as Risk Levels 1, 2, or 3:

1. Prepare a Stormwater Pollution Prevention Plan under section 13-3
2. Job site activities cannot start until a SWPPP is authorized and a waste discharge ID is issued

For all projects (as part of a WPCP or SWPPP):

1. Provide submittals as required under sections 13-1.01C
2. Train employees under section 13-1.01D(3)
3. Assign a Water Pollution Control Manager under section 13-1.01D(4)

Section 13-1.01E describes means of enforcement as well as penalties for non-compliance

Information on forms, reports, and other documents is in the following Caltrans manuals:

1. Field Guide to Construction Site Dewatering
2. Stormwater Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual
3. Construction Site Best Management Practices (BMPs) Manual
4. Construction Site Monitoring Program Guidance Manual

You may view these manuals at the [Stormwater and Water Pollution Control Information link at the Caltrans website](#) or purchase them at the Caltrans Publication Distribution Unit.

A WPCP and a SWPPP must comply with the Caltrans Stormwater Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual and must be prepared using the latest template posted on the Caltrans Construction stormwater website.

13-1.01B Definitions

active area: Area where soil-disturbing work activities have occurred at least once within 15 days.

construction phase: Phase that includes (1) the highway construction phase for building roads, drainage facilities, and structures, (2) the plant establishment, permanent erosion control establishment, and maintenance phase for placing vegetation for final stabilization, and (3) the suspension phase for suspension of work activities or a winter shutdown. The construction phase starts at the start of job site activities and ends at Contract acceptance.

inactive area: Area where soil-disturbing work activities have not occurred within 15 days.

qualifying rain event: Storm that produces at least 0.5 inch of precipitation with a 48-hour or greater period between rain events.

run-on: Water that originates off-site and flows onto the job site.

storm event: Storm that produces or is forecasted to produce at least 0.10 inch of precipitation within a 24-hour period.

13-1.01C Submittals

13-1.01C(1) General

Within 48 hours after (1) the end of a storm event resulting in a discharge, (2) a nonstormwater discharge, or (3) receiving a written notice or an order from the RWQCB or another regulatory agency, submit the following information:

1. Date, time, location, and nature of the activity and the cause of the discharge, notice, or order
2. Type and quantity of the discharge
3. WPC practices in use before the discharge or before receiving the notice or order
4. Description of WPC practices and corrective actions taken to manage the discharge or cause of the notice

13-1.01C(2) Training Records

For all employees and subcontractors who will be working at the job site, submit WPC training records as informational submittals. The records must include the training subjects and dates for the initial training, ongoing training, and tailgate meetings. Submit records for:

1. Existing employees within 5 business days of obtaining the SWPPP or WPCP authorization
2. New employees within 5 business days of receiving the training
3. Subcontractors' employees at least 5 business days before a subcontractor starts work

13-1.01C(3) Contractor-Support Facilities

At least 5 business days before operating any Contractor-support facility, submit:

1. Plan showing the location and associated WPC practices
2. Copy of the notice of intent approved by the RWQCB and the WPCP or SWPPP approved by the RWQCB if you will be operating a batch plant or a crushing plant under the Industrial General Permit
3. Copy of the plans for an offsite drying facility if you will be drying liquid residue from concrete grooving or grinding activities before disposal. The facility may include temporary lined ponds or other measures to prevent the liquid residue from infiltrating the soil. The plans must be sealed and signed by an engineer who is registered as a civil engineer in the State.

13-1.01C(4) Water Quality Monitoring

13-1.01C(4)(a) General

Section 13-1.01C(4) applies if a bid item for a water quality monitoring report is shown on the Bid Item List.

13-1.01C(4)(b) Water Quality Monitor

Within 7 days after Contract approval, submit the name and qualifications of your water quality monitor. Include the monitor's training and experience in collecting and analyzing water quality samples.

13-1.01C(4)(c) Water Quality Monitoring Reports

Whenever work activities occur in water, submit a monthly report of water quality monitoring by the 7th of the month for the monitoring work conducted during the previous month. The report must include:

1. Visual inspection reports for each storm event and nonstormwater discharge. Each visual inspection report must include:
 - 1.1. Name of personnel performing the inspection, inspection date, and date the inspection report was completed

- 1.2. Descriptions of storm and weather conditions
- 1.3. Locations and observations
2. Field inspection reports and sampling results, including:
 - 2.1. Description of the analytical methods used, reporting units, and detection limits
 - 2.2. Date, location, time of sampling, visual observations, photographs, and measurements
 - 2.3. Estimate of water flow
 - 2.4. Calibration logs for field monitoring equipment
3. Visual inspection reports and sampling results for a storm event that generates visible runoff, including:
 - 3.1. Date, location, and time of visual observations
 - 3.2. Photographs of the areas disturbed by project activities, including material disposal areas
 - 3.3. Photographs showing the disturbed soil areas and documenting compliance for erosion control and revegetation measures, including soil stabilization and sediment control
4. Summary of WQO exceedance reports
5. Summary of corrective actions

If a WQO is exceeded during work activities in water, submit a WQO exceedance report within 6 hours. The report must include:

1. Field inspection reports and sampling results, including:
 - 1.1. Description of the analytical methods used, reporting units, and detection limits
 - 1.2. Date, location, time of sampling, visual observations, photographs, and measurements
 - 1.3. Estimate of the water flow
2. Description of WPC practices and corrective actions taken to manage WQO exceedance

13-1.01C(4)(d) Water Quality Annual Reports

Section 13-1.01C(4)(d) applies if a bid item for a water quality annual report is shown on the Bid Item List.

Submit a water quality annual report for each reporting period from July 1st to June 30th. If construction occurs through June 30th, submit the report no later than July 15th for the previous reporting period. If construction ends before June 30th, submit the report within 15 days after Contract acceptance.

The report must be in an authorized format and include:

1. Project's description, location, and receiving waters
2. Water quality monitoring information, such as:
 - 2.1. Summary and evaluation of sampling and analysis results and laboratory reports
 - 2.2. Analytical methods, reporting units, and detection limits for analytical parameters
 - 2.3. Summary of corrective actions
 - 2.4. Identification of corrective actions or compliance activities that were not implemented
 - 2.5. Summary of any exceedances
 - 2.6. Names of individuals performing water quality inspections and sampling
 - 2.7. Logistical information for inspections and sampling, including the location, date, time, and precipitation
 - 2.8. Visual observations and sample collection records
3. Photographs documenting Contract compliance for:
 - 3.1. Disturbed soil areas created by work activities
 - 3.2. Erosion control and revegetation measures, including soil stabilization and sediment control practices
 - 3.3. Completed work
4. Records of training and meetings for water quality permit compliance

Submit 2 copies of the water quality annual report. Allow 10 days for review. If revisions are required, the Engineer notifies you of the date the review stopped and provides comments. Submit a revised report within 5 business days of receiving the comments. The Department's review resumes when the complete report is resubmitted.

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Submit an electronic copy on a read-only CD, DVD, or other Engineer-authorized data-storage device and 2 printed copies of the authorized water quality annual report. Include the signed certifications from the water quality monitor and the WPC manager.

13-1.01C(5) Disposal Documentation

At least 15 days before starting concrete grooving or grinding activities, submit a copy of one of the following documents from the disposal facility that will receive the grooving or grinding residue:

1. RWQCB permit allowing the facility to manage and dispose of the residue
2. Written approval from the RWQCB authorizing the facility to receive the residue
3. Local, state, or federal permits if the facility is located outside the State

For partial listing of disposal facilities and their waste acceptance list, go to SWRCB website.

Within 5 business days of completing concrete grooving or grinding activities, submit the disposal receipts and weight tickets as informational submittals.

13-1.01C(6)–13-1.01C(8) Reserved

13-1.01D Quality Assurance

13-1.01D(1) General

Reserved

13-1.01D(2) Regulatory Requirements

Comply with the [NPDES General Permit for “Storm Water Discharges Associated with Construction and Land Disturbance Activities” \(Order No. 2009-009-DWQ, NPDES No. CAS000002, as modified by 2010-0014-DWQ and 2012-2006 DWQ\), also known as the Construction General Permit \(CGP\).](#) ~~Caltrans general permit issued by the SWRCB for Order No. 2012-0011 DWQ, NPDES No. CAS000003, National Pollutant Discharge Elimination System (NPDES) Statewide Storm Water Permit and Waste Discharge Requirements (WDRS) for State of California, Department of Transportation. The Caltrans general permit governs stormwater and nonstormwater discharges from Caltrans properties, facilities, and activities. For the Caltrans general permit, go to the Caltrans Program link on the Storm Water Program page of the SWRCB website.~~

Discharges from manufacturing facilities, such as batch plants and crushing plants, must comply with the discharge requirements in the NPDES General Permit for Storm Water Discharges Associated with Industrial Activities; Order No. 2014-0057-DWQ, CAS000001 (Industrial General Permit), issued by the SWRCB. For the Industrial General Permit, go to the SWRCB website.

For a batch plant and crushing plant outside a job site or within a job site that serves one or more contracts, obtain coverage under the Industrial General Permit before operating a batch plant to manufacture concrete, HMA, or other material or a crushing plant to produce rock or aggregate.

13-1.01D(3) Training

Employees must receive initial WPC training before starting work at the job site.

For your project managers, supervisory personnel, subcontractors, and employees involved in WPC work:

1. Provide stormwater training in the following subjects:
 - 1.1. WPC rules and regulations
 - 1.2. Implementation and maintenance of:
 - 1.2.1. Temporary soil stabilization
 - 1.2.2. Temporary sediment control
 - 1.2.3. Tracking control
 - 1.2.4. Wind erosion control
 - 1.2.5. Material pollution prevention and control
 - 1.2.6. Waste management
 - 1.2.7. Nonstormwater management
2. Conduct weekly training meetings covering:

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SECTION 13

WATER POLLUTION CONTROL

- 2.1. Deficiencies and corrective actions for WPC practices
- 2.2. WPC practices required for work activities during the week
- 2.3. Spill prevention and control
- 2.4. Material delivery, storage, usage, and disposal
- 2.5. Waste management
- 2.6. Nonstormwater management procedures

Training for personnel who collect water quality samples must include:

1. Review of the sampling and analysis plan and the *Construction Site Monitoring Program Guidance Manual*
2. Health and safety review
3. Sampling simulations

13-1.01D(4) Water Pollution Control Manager

13-1.01D(4)(a) General

Assign a WPC manager to implement the WPCP or SWPPP.

13-1.01D(4)(b) Qualifications

The WPC manager must:

1. Comply with the requirements provided in the Construction General Permit for:
 - 1.1. QSP if the project requires a WPCP
 - 1.2. QSD if the project requires a SWPPP
2. Complete the stormwater management training described at the Stormwater and Water Pollution Control Information link at the Department's Division of Construction website

13-1.01D(4)(c) Responsibilities

The WPC manager must:

1. Be the primary contact responsible for WPC work
2. Oversee WPC work, including:
 - 2.1. Maintenance of WPC practices
 - 2.2. Inspections of WPC practices identified in the SWPPP or WPCP
 - 2.3. Inspections and reports for visual monitoring
 - 2.4. Preparation and implementation of the rain event action plans
 - 2.5. Sampling and analysis
 - 2.6. Preparation and submittal of:
 - 2.6.1. NAL exceedance reports
 - 2.6.2. Violation reports for the receiving water monitoring trigger
 - 2.6.3. Annual reports
 - 2.6.4. WPC-practice status reports
3. Oversee and enforce hazardous waste management practices under section 14-11, including spill prevention and control measures
4. Have the authority to:
 - 4.1 Mobilize crews to make immediate repairs to WPC practices
 - 4.2 Stop construction activities damaging WPC practices or causing water pollution
5. Ensure that all employees have current WPC training and provide training if collecting water quality samples is delegated
6. Implement the authorized SWPPP or WPCP
7. Revise the SWPPP or WPCP if required
8. Be at the job site within 2 hours of being contacted

13-1.01D(5) Quality Control

13-1.01D(5)(a) General

Section 13-1.01D(5) applies if a bid item for a water quality monitoring report is shown on the Bid Item List.

Project-specific WQOs for work activities in water are specified in the special provisions.

Assign a water quality monitor to collect water samples and record water quality data. The water quality monitor must have the same qualifications as the WPC manager, including the requirements for a QSP, and must have training and experience in collecting and analyzing water quality samples. The water quality monitor may be the same person as the WPC manager.

The water quality monitor must be responsible for generating and submitting water quality reports.

The water quality monitor must notify the Engineer within 6 hours of an unauthorized discharge.

The water quality monitor must inspect the job site and receiving waters after each storm event and nonstormwater discharge. The inspection of a nonstormwater discharge must include observation of:

1. Receiving waters:
 - 1.1. 24 hours before starting work in water, including the installation of any clear-water diversion
 - 1.2. At least 4 times daily whenever work occurs in water, including the installation, operation, and removal of any clear water diversion
 - 1.3. For the presence of floating and suspended materials, sheen on the surface, discoloration, turbidity, and odors.
2. Job site for the presence of authorized and unauthorized nonstormwater discharges and their sources. Unauthorized discharges to surface waters include:
 - 2.1. Soil, silt, and sand
 - 2.2. Bark, sawdust, and slash
 - 2.3. Rubbish and debris
 - 2.4. Cement, concrete, and concrete washings
 - 2.5. Oil and petroleum products
 - 2.6. Welding slag
 - 2.7. Other organic or earthen materials

Retain each visual inspection report at the job site.

13-1.01D(5)(b) Water Quality Sampling and Analysis

Take water quality samples each day a construction activity has the potential to mobilize sediment or alter background conditions within waters of the State. Take water quality samples of surface water when:

1. Conducting in-water work
2. Work activities result in materials reaching receiving waters
3. Work activities result in the creation of a visible plume in receiving waters

Comply with the equipment manufacturer's instructions for sample collection, analysis methods, and equipment calibration.

At least 24 hours before starting in-water work:

1. Establish locations for water quality sampling:
 - 1.1. Upstream of the effluent discharge point or location of in-water work by no more than 50 feet
 - 1.2. At the effluent discharge point, including the location of in-water work
 - 1.3. Downstream of the effluent discharge point or location of in-water work between 35 and 50 feet
2. Take water quality samples to document background conditions for upstream, effluent, and downstream locations. Test for each water quality objective shown in the table titled "Water Quality Objectives."
3. Estimate water flow.

During in-water work, including the installation of a clear water diversion, take water quality samples:

1. At least 4 times daily for each water quality objective
2. At upstream, effluent, and downstream locations

If a water quality objective is exceeded, the water quality monitor must notify the Engineer by phone or electronic media within 30 minutes and:

1. Conduct water quality sampling every hour until measurements comply with water quality objectives.
2. Measure the distance from the effluent location to the downstream extent of the exceedance.
3. Obtain photographs of the tributary upstream, downstream, and at the location of in-water work.
4. If WPC practices are installed, repaired, or modified to control the source of the exceedance, monitor the activity and document with samples, photographs, and a brief summary.

You are not required to collect samples:

1. During dangerous weather conditions, such as flooding or electrical storms
2. Outside of normal working hours

If downstream samples show levels outside of the acceptable range and indicate a possible water quality objective exceedance, assess the WPC practices, site conditions, and surrounding influences to determine the probable cause for the increase.

Retain calibration logs, water quality sampling documentation, and analytical results at the job site.

13-1.01D(5)(c) Reserved

13-1.01D(6)–13-1.01D(8) Reserved

13-1.01E Enforcement for Non-Compliance

Section 13-1.01E provides for the Agency to enforce this section and take corrective action for your non-compliance with the requirements of section 13, including all laws, regulations, rules, policies, plans and the WPCP or SWPPP that are incorporated by reference. The Agency's exercise of these enforcement provisions in no way limits your contractual obligations, potential liability or obligation to defend and indemnify the County/District from enforcement or penalties imposed by local, State or Federal Government agencies, including the County/District, acting in their capacities as regulatory agencies.

In addition to other remedies otherwise available to the Agency, and depending on the severity and timing of the violation, and your responsiveness, the Agency may elect to do one or more of the following at any time:

1. Issue a Stop Notice for the Project. The Stop Notice will be enforced until you bring the site to compliance with WPCP or SWPPP requirements. Each working day within the Stop Notice period will count as a construction work day towards the construction contract duration. All construction delay resulting from a Stop Notice issued under this provision will be delay from which liquidated damages may be assessed.
2. Abate the portion of the construction site or Project that is in violation. The Agency may at any time following non-compliance, with a notice of first time non-compliance, use Agency forces and/or a hired contractor to implement the abatement. The intent of the abatement is to mitigate the violation expeditiously before the Agency is fined and/or penalized by local, State and/or Federal regulatory agencies for your non-compliance. The extent of abatement will be the minimum treatment measures necessary to bring the site into compliance. The actual costs of abatement, including but not limited to administrative and incidental costs and expenses, will be documented and deducted from the monthly progress payment due, withheld from retention or otherwise backcharged to you. The treatment measures implemented will then become your property and responsibility. You will be responsible for adjusting the treatment as necessary in accordance with your operation. You cannot lay claim for time, money, or otherwise against the Agency for inconvenience, obstruction to your operation, or delay as a result of the treatment installation.

Furthermore, you must defend and indemnify the County/District for any and all fines, claims, actions, assessments, penalties or administrative actions imposed by local, State and /or Federal agencies, including the Agency/County/District acting in its capacity as a regulatory body, as a result of your inability or failure to comply with the minimum storm water pollution prevention

requirements of these Specifications, including, but not limited to the WPCP or SWPPP and any instruction from the Engineer or any regulatory entity.

13-1.02 MATERIALS

Not Used

13-1.03 CONSTRUCTION

13-1.03A General

Monitor the NWS's forecast daily at its website.

Install facilities and devices used for WPC practices before performing other job site activities. Install soil stabilization and sediment control materials for WPC practices in all active areas or before any storm event.

Repair or replace facilities and devices used for WPC practices within 24 hours of discovering any damage.

You may request or the Engineer may order changes to the WPC work. Changes may include additional or new WPC practices. Additional WPC work is change order work.

Retain a printed copy of the authorized WPCP or SWPPP at the job site.

13-1.03B Contractor-Support Facilities

Use WPC practices to protect stormwater systems or receiving waters from the discharge of potential pollutants from any Contractor-support facility.

Contractor-support facilities include:

1. Staging areas
2. Storage yards for equipment and materials
3. Mobile operations
4. Batch plants for concrete and HMA
5. Crushing plants for rock and aggregate
6. Other facilities installed for your convenience, such as haul roads
7. Offsite drying facilities for drying wastes before disposal

If you obtain or dispose of material at a noncommercially operated borrow or disposal site, prevent water pollution due to erosion at the site during and after completion of your activities. Upon completion of your work, leave the site in a condition such that water will not collect or stand in it.

13-1.03C Inspections

Use the Alameda County Stormwater Best Management Status Report form (Information Handout E) for documenting the weekly status of BMPs.

~~Use the Stormwater Site Inspection Report form for documenting inspections.~~

Inspect WPC practices identified in the SWPPP or WPCP:

1. Before a forecasted storm event
2. After a qualifying rain event that produces runoff
3. At 24-hour intervals during extended storm events
4. On a predetermined schedule of at least once a week

Inspect the following work activities and areas daily:

1. Storage areas for hazardous materials and waste as specified in section 14-11
2. Hazardous waste disposal and transporting activities as specified in section 14-11
3. Hazardous material delivery and storage activities
4. Demolition sites within 50 feet of storm drain systems and receiving waters

Inspect vehicles and equipment at the job site daily for leaks and spills. Verify that operators are inspecting vehicles and equipment each day of use.

Inspect the following work activities and areas daily if the activity occurs daily or weekly if the activity occurs weekly:

1. Vehicle and equipment cleaning facilities
2. Vehicle and equipment maintenance and fueling areas
3. Pile driving areas for leaks and spills
4. Temporary concrete washouts
5. Paved roads at job site access points for street sweeping
6. Dewatering work
7. Temporary ATS
8. Work over water

13-1.03D Deficiencies

If the Engineer or you identify a deficiency in the implementation of the authorized WPCP or SWPPP, immediately correct the deficiency unless a later date is authorized, but before precipitation occurs.

The Agency may correct the deficiency if you fail to correct it immediately, by the agreed date, or before the onset of precipitation. The cost of this work is deducted.

13-1.03E–13-1.03H Reserved**13-1.04 PAYMENT**

The Agency does not pay for the cleanup, repair, removal, disposal, or replacement of WPC practices due to improper installation or your negligence.

The Agency does not pay for WPC practices at Contractor-support facilities and noncommercially operated borrow or disposal sites.

13-2 WATER POLLUTION CONTROL PROGRAM**13-2.01 GENERAL****13-2.01A Summary**

Section 13-2 includes specifications for preparing a water pollution control program.

Preparing a water pollution control program includes developing and implementing the WPCP, providing a WPC manager, conducting WPC training, and monitoring, inspecting and correcting WPC practices.

If the Agency determines that the project qualifies for an erosivity waiver, the conditions for the waiver are specified here. The erosivity waiver and R-factor are described in the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities.

13-2.01B Definitions

Reserved

13-2.01C Submittals

Within 7 days after Contract approval, submit one printed copy and an electronic copy of your WPCP unless different quantities are ordered at the preconstruction conference. You may assign a QSP other than the WPC manager to develop the WPCP.

The WPCP must:

1. Show the location of disturbed soil areas, water bodies, and water conveyances
2. Describe the work involved in the installation, maintenance, repair, and removal of temporary WPC practices
3. Show the locations and types of WPC practices that will be used for:
 - 3.1. Stormwater and nonstormwater in Contractor-support facilities outside the job site but related to work activities, including:
 - 3.1.1. Staging areas

- 3.1.2. Storage yards
- 3.1.3. Access roads
- 3.2. Activities or mobile activities related to all NPDES permits
- 4. Show the locations and types of temporary WPC practices that will be used in the work for whichever has the longest duration in the first:
 - 4.1 60 days
 - 4.2 Construction phase
- 5. Show the locations and types of WPC practices that will be installed permanently under the Contract
- 6. Include a schedule showing when:
 - 6.1. Work activities will be performed that could cause the discharge of pollutants into stormwater
 - 6.2. WPC practices, including soil stabilization and sediment control, associated with each construction phase will be implemented
- 7. Include a copy of each permit obtained by the Agency, such as the Department of Fish and Game permits, US Army Corps of Engineers permits, RWQCB 401 certifications, Docket No. ESPO-SMA 15/16-001 Soil Management Agreement for Aerially Deposited Lead-Contaminated Soils with the DTSC (ADL Agreement), ADL Agreement notification, and RWQCB waste discharge requirements for reuse of aerially deposited lead

Allow 5 business days for review.

After the Engineer authorizes the WPCP, submit one printed copy and an electronic copy of the authorized WPCP.

If a RWQCB requires review of the authorized WPCP, the review is specified here and the Engineer submits the authorized WPCP to the RWQCB for review and comment.

If the Engineer orders changes to the WPCP based on the RWQCB's comments, submit a revised WPCP within 3 business days.

Do not start job site activities until the WPCP is authorized.

Submit a revised WPCP if:

- 1. Changes in work activities could affect the discharge of pollutants
- 2. WPC practices are added as change order work
- 3. WPC practices are added at your discretion
- 4. Changes in the quantity of disturbed soil are substantial
- 5. Objectives for reducing or eliminating pollutants in stormwater discharges have not been achieved
- 6. Project receives a written notice or order from the RWQCB or any other regulatory agency

13-2.01D Quality Assurance

Reserved

13-2.02 MATERIALS

Not Used

13-2.03 CONSTRUCTION

Manage work activities such that you reduce the discharge of pollutants to surface waters, groundwaters, and municipal-separate storm sewer systems.

Monitor and inspect WPC practices at the job site.

Notify the Engineer within 6 hours whenever you:

- 1. Identify discharges into receiving waters or drainage systems that are causing or could cause water pollution
- 2. Receive a written notice or order for the project from the RWQCB or any other regulatory agency

Continue WPCP implementation during any suspension of work activities.

You must submit a SWPPP and pay all associated costs if you do any of the following:

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1. Disturb 1 ac or more of soil on a project without an erosivity waiver
2. Disturb more than 5 ac of soil on a project with an erosivity waiver
3. Fail to comply with the schedule for soil-disturbing activities for a project with an erosivity waiver and the delay voids the erosivity waiver

13-2.04 PAYMENT

The Agency pays you for prepare water pollution control program as follows:

1. Total of 75 percent of the item total upon authorization of the WPCP
2. Total of 100 percent of the item total upon Contract acceptance.

13-3 STORMWATER POLLUTION PREVENTION PLAN

Not Used

13-4 JOB SITE MANAGEMENT**13-4.01 GENERAL****13-4.01A Summary**

Section 13-4 includes specifications for performing job site management work.

Job site management work includes spill prevention and control, material management, waste management, nonstormwater management, and dewatering activities.

Temporary linear sediment barriers must comply with section 13-10.

13-4.01B Definitions

minor spill: Spill of oil, gasoline, paint, or other materials in such small quantities that can easily be controlled by a first responder upon discovery of the spill.

semisignificant spill: Spill of oil, gasoline, paint, or other materials in quantities that can be controlled by a first responder with help from other personnel.

significant or hazardous spill: Spill of oil, gasoline, paint, or other materials in quantities that cannot be controlled by job site personnel.

13-4.01C Submittals

At least 15 days before the start of dewatering activities, submit a dewatering and discharge work plan. The dewatering and discharge work plan must include:

1. Title sheet and table of contents
2. Description of dewatering and discharge activities detailing the locations, quantity of water, equipment, and discharge point
3. Estimated schedule for dewatering and the discharge start and end dates of intermittent and continuous activities
4. Discharge alternatives, such as dust control or percolation
5. Visual monitoring procedures with inspection log
6. Copy of the approval to discharge into a sanitary sewer system

For material used or stored within the job site, submit the following documents as informational submittals:

1. SDS at least 5 business days before material is used or stored
2. Monthly inventory records

Submit approval from the local health agency, city, county, and sewer district before discharging from a sanitary or septic system directly into a sanitary sewer system.

Submit a discharge notification upon discovery of a spill or discharge of materials into a body of water.

13-4.01D Quality Assurance

Reserved

13-4.02 MATERIALS

Not Used

13-4.03 CONSTRUCTION**13-4.03A General**

Implement effective housekeeping practices for handling, storing, using, and disposing of materials to prevent pollution. Limit potential pollutants at their source before they come in contact with stormwater.

13-4.03B Spill Prevention and Control**13-4.03B(1) General**

Keep material or waste storage areas clean, well organized, and equipped with enough cleanup supplies for the material being stored.

Implement spill and leak prevention procedures for chemicals and hazardous substances stored on the job site. If you spill or your equipment or materials leak chemicals or hazardous substances at the job site, you are responsible for all associated cleanup costs and related liability.

Prevent spills from entering stormwater runoff before and during cleanup activities. Do not bury the spill or wash it with water.

Immediately report spills to the WPC manager.

As soon as it is safe, contain and clean up spills of petroleum materials and sanitary and septic waste substances listed in 40 CFR, parts 110, 117, and 302. Comply with section 14-11 for a spill or leak that produces hazardous waste.

13-4.03B(2) Minor Spills

Clean up a minor spill as follows:

1. Contain the spread of the spill.
2. Recover the spilled material using absorbents.
3. Clean the contaminated area.
4. Promptly dispose of the contaminated material and absorbents.

13-4.03B(3) Semisignificant Spills

Immediately clean up a semisignificant spill as follows:

1. Contain the spread of the spill.
2. On a paved or other impervious surface, encircle and recover the spilled material with absorbents.
3. On soil, construct an earthen dike and dig up the contaminated soil for disposal.
4. During precipitation, cover the spill with 10-mil plastic sheeting or other material to prevent contamination of the runoff.
5. Promptly dispose of the contaminated material and absorbents.

13-4.03B(4) Significant or Hazardous Spills

Immediately notify the Engineer and qualified personnel of a significant or hazardous spill. Handle the spill as follows:

1. Do not attempt to clean up the spill until qualified personnel have arrived.
2. Obtain the immediate services of a spill contractor or hazardous material team.
3. Notify local emergency response teams by dialing 911 and county officials by using the emergency phone numbers retained at the job site.
4. Notify the California State Warning Center at (800) 852-7550.
5. Notify the National Response Center at (800) 424-8802 regarding spills of Federal reportable quantities under 40 CFR 110, 117, and 302.
6. Notify other agencies as appropriate, including:

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- 6.1. Fire department
- 6.2. Public works department
- 6.3. US Coast Guard
- 6.4. California Highway Patrol
- 6.5. City police or county sheriff's department
- 6.6. DTSC
- 6.7. Department of Conservation, Division of Oil, Gas, and Geothermal Resources
- 6.8. Cal/OSHA
- 6.9. RWQCB

13-4.03B(5)–13-4.03B(6) Reserved**13-4.03C Material Management****13-4.03C(1) General**

Minimize or eliminate discharge of material into the air, storm drain systems, and receiving waters while taking delivery of, using, or storing the following materials:

1. Hazardous chemicals, including acids, lime, glues, adhesives, paints, solvents, and curing compounds
2. Soil stabilizers and binders
3. Fertilizers
4. Detergents
5. Plaster
6. Petroleum materials, including fuel, oil, and grease
7. Asphalt and concrete components
8. Pesticides and herbicides

Employees trained in emergency spill cleanup procedures must be present during the unloading of hazardous materials or chemicals.

Minimize the use of hazardous materials if practicable.

Perform each of the following activities at least 100 feet from a concentrated flow of stormwater, a drainage course, or an inlet wherever it is performed (1) within the floodplain or (2) at least 50 feet outside the floodplain:

1. Stockpiling materials
2. Storing pile-driving equipment and liquid waste containers
3. Washing vehicles and equipment in outside areas
4. Fueling and maintaining vehicles and equipment

13-4.03C(2) Material Storage

Store materials in their original containers with the original labels maintained in legible condition. Immediately replace damaged or illegible labels.

Comply with section 14-11.03 for the storage of liquids, petroleum materials, and substances listed in 40 CFR 110, 117, and 302.

Store bagged or boxed material on pallets. Protect bagged or boxed material from wind and rain during non-working days and whenever precipitation is forecasted.

13-4.03C(3) Stockpile Management

Minimize stockpiling of materials at the job site.

Do not allow soil, sediment, or other debris from stockpiles to enter storm drains, open drainages, or watercourses.

Manage stockpiles by implementing WPC practices on:

1. Active stockpiles before a forecasted storm event

2. Inactive stockpiles according to the WPCP or SWPPP schedule

Cover active and inactive soil stockpiles with soil stabilization material or a temporary cover and surround them with a linear sediment barrier.

Cover stockpiles of concrete and asphalt concrete rubble, HMA, AB, or AS with a temporary cover and surround them with a linear sediment barrier.

Place stockpiles of pressure-treated wood on pallets and cover them with an impermeable material.

Place stockpiles of cold mix asphalt concrete on an impervious surface and cover them with an impermeable material. Protect the stockpile from stormwater run-on and runoff.

Repair or replace linear sediment barriers and covers as needed to keep them functioning properly. If sediment accumulates to 1/3 of the linear sediment barrier's height, remove the accumulated sediment.

13-4.03C(4)–13-4.03C(6) Reserved

13-4.03D Waste Management

13-4.03D(1) General

Manage solid waste under section 14-10.

Manage hazardous waste under section 14-11.

13-4.03D(2) Paint Waste

Clean water-based and oil-based paint from brushes or equipment within a contained area to prevent contamination of soil, receiving waters, or storm drain systems. Handle and dispose of paints, thinners, solvents, residues, and sludges that cannot be recycled or reused as hazardous waste under section 14-11. When thoroughly dry, dispose of dry latex paint, paint cans, used brushes, rags, absorbent materials, and drop cloths as solid waste under section 14-10.

13-4.03D(3) Concrete Waste

Prevent the discharge of concrete and asphalt concrete waste into storm drain systems and receiving waters.

Collect concrete waste simultaneously with the waste-producing activity. Concrete waste includes grout, dust, debris, residue, and slurry from demolition, saw cutting, coring, grooving, or grinding activities.

Dispose of liquid residue from concrete grooving or grinding activities at an appropriately permitted disposal facility.

If authorized, you may transport liquid grooving or grinding residue to a contractor-support facility for drying.

13-4.03D(4) Sanitary and Septic Waste

Do not bury or discharge wastewater from a sanitary or septic system within the [highway right-of-way](#). A sanitary facility discharging into a sanitary sewer system must be properly connected and free from leaks. Place a portable sanitary facility at least 50 feet away from storm drains, receiving waters, and flow lines.

Comply with local health agency regulations if using an on-site disposal system.

13-4.03D(5) Liquid Waste

Prevent job-site liquid waste from entering storm drain systems and receiving waters. Liquid wastes include:

1. Drilling slurries or fluids
2. Grease- and oil-free wastewater and rinse water
3. Dredgings, including liquid waste from cleaning drainage systems
4. Liquid waste running off a surface, including wash and rinse water
5. Other nonstormwater liquids not covered by separate permits

Store liquid waste in structurally sound, leak-proof containers, such as roll-off bins or portable tanks.

Provide enough liquid waste containers with enough volume to prevent overflow, spills, and leaks.

Store containers at least 50 feet from moving vehicles and equipment.

Remove and dispose of deposited solids from sediment traps under section 14-10 unless another method is authorized.

Liquid waste may require testing to determine hazardous material content before disposal.

Dispose of drilling fluids and residue.

If an authorized location is available within the job site, fluids and residue exempt under 23 CA Code of Regs § 2511(g) may be dried by evaporation in a leak-proof container. Dispose of the remaining solid waste under section 14-10.

13-4.03D(6)–13-4.03D(8) Reserved

13-4.03E Nonstormwater Management

13-4.03E(1) General

Use water for work activities such that erosion and the discharge of pollutants into storm drain systems and receiving waters are prevented. Obtain authorization before washing anything at the job site with water that could discharge into a storm drain system or receiving waters. Immediately report discharges.

Sweep and vacuum paved areas. Do not wash paved areas with water.

Direct runoff water, including water from the repair of a water line, from the job site to areas where it can infiltrate into the ground. Do not allow spilled water to escape the areas used to fill water trucks. Manage run-on to minimize contact with job site water.

13-4.03E(2) Illicit Connection and Illegal Discharge Detection and Reporting

Before starting work and daily thereafter, inspect the job site and its perimeter for the following evidence of illicit connections, illegal discharges, and dumping:

1. Debris or trash piles
2. Staining or discoloration on pavement or soils
3. Pungent odors coming from drainage systems
4. Discoloration or an oily sheen on water
5. Stains and residue in ditches, channels, or drain boxes
6. Abnormal water flow during dry weather
7. Excessive sediment deposits
8. Nonstandard drainage junction structures
9. Broken concrete or other disturbances at or near junction structures

If evidence of an illegal connection, discharge, or dumping is discovered, immediately notify the Engineer. Do not take further action unless ordered. Assume that unlabeled or unidentifiable material is hazardous.

13-4.03E(3) Vehicle and Equipment Cleaning

Limit vehicle and equipment cleaning or washing at the job site except for the safety and protection of the equipment and as needed to comply with PLACs. Notify the Engineer before cleaning vehicles and equipment at the job site with soap, solvents, or steam. Contain and recycle or dispose of resulting waste under section 14-11 or section 13-4.03D(5), whichever is applicable. Do not use diesel to clean vehicles or equipment. Minimize the use of solvents.

Clean or wash vehicles and equipment in a structure equipped with disposal facilities. You may wash vehicles in an outside area if the area is:

1. Paved with concrete or asphalt concrete
2. Surrounded by a containment berm
3. Equipped with a sump to collect and dispose of wash water

Use as little water as practicable when washing vehicles and equipment. Hoses must be equipped with a positive shutoff valve.

Discharge the liquid from wash racks to a recycling system or to another authorized system. Remove liquids and sediment as necessary.

13-4.03E(4) Vehicle and Equipment Fueling and Maintenance

If practicable, perform maintenance on vehicles and equipment off-site.

If fueling or maintenance must be performed at the job site, obtain authorization for an assigned area or areas for these activities before using them. Minimize mobile fueling and maintenance activities. Perform fueling and maintenance activities on level ground in areas protected from stormwater run-on and runoff.

Use containment berms or dikes around fueling and maintenance areas. Keep enough absorbents and spill kits in the fueling or maintenance area and on fueling trucks to handle potential spills. Dispose of spill-cleanup material and kits immediately after use. Use drip pans or absorbent pads during fueling or maintenance.

Do not leave fueling or maintenance areas unattended during fueling and maintenance activities. Fueling nozzles must be equipped with (1) an automatic shutoff control and (2) vapor recovery where required by the Air Quality Management District. Secure nozzles in an upright position when not in use. Do not top off fuel tanks.

Recycle or properly dispose of used batteries and tires.

If leaks cannot be repaired immediately, remove the vehicle or equipment from the job site.

13-4.03E(5) Material and Equipment Used Over Water

Place drip pans and absorbent pads under vehicles and equipment used over water. Keep enough spill-cleanup material with the vehicles and equipment to handle potential spills. Place drip pans or plastic sheeting under vehicles and equipment on docks, barges, or other surfaces over water whenever the vehicles or equipment will be idle for more than 1 hour.

Install watertight curbs or toe boards on barges, platforms, docks, or other surfaces over water to contain material, debris, and tools. Secure any material or debris to prevent spills or discharge into the water due to wind.

Report discharges to receiving waters immediately upon discovery.

13-4.03E(6) Structure Removal Over or Adjacent to Water

Do not allow demolished material to enter storm drain systems and receiving waters. Use authorized covers and platforms to collect debris. Use attachments on equipment to catch debris during small demolition activities. Empty debris-catching devices daily and handle debris under section 13-4.03D.

13-4.03E(7) Paving, Sealing, Saw Cutting, Grooving, and Grinding Activities

Prevent the following materials from entering storm drain systems and receiving waters:

1. Cementitious material
2. Asphaltic material
3. Aggregate or screenings
4. Saw cutting, grooving, and grinding residue
5. Pavement chunks
6. Shoulder backing
7. Methacrylate resin
8. Sandblasting residue

Cover drainage inlets and use linear sediment barriers to protect downhill receiving waters until paving, saw cutting, grooving, and grinding activities are completed and excess material has been removed. Cover drainage inlets and manholes during the application of seal coat, tack coat, slurry seal, or fog seal.

Whenever precipitation is forecasted, limit paving, saw cutting, and grinding to places where runoff can be captured.

Do not start seal coat, tack coat, slurry seal, or fog seal activities when precipitation is forecasted during the application and curing period.

Do not grind or groove pavement during precipitation.

Use a vacuum to remove slurry immediately after it is produced. Do not allow the slurry to run onto lanes open to traffic or off the pavement.

Collect the residue from grooving and grinding activities with a vacuum attachment on the grinding machine. Do not leave the residue on the pavement or allow it to flow across the pavement.

You may stockpile material removed from existing roadways under section 13-4.03C(3) if authorized.

Do not coat asphalt trucks and equipment with substances that contain soap, foaming agents, or toxic chemicals.

When paving equipment is not in use, park the paving equipment over drip pans or plastic sheeting with absorbent material to catch drips.

13-4.03E(8) Thermoplastic Striping and Pavement Markers

Do not preheat, transfer, or load thermoplastic within 50 feet of drainage inlets or receiving waters.

Do not unload, transfer, or load bituminous material for pavement markers within 50 feet of drainage inlets or receiving waters.

Collect and dispose of bituminous material from the roadway after removing markers.

13-4.03E(9) Pile Driving

Keep spill kits and cleanup materials at pile driving locations. Park pile driving equipment over drip pans, absorbent pads, or plastic sheeting with absorbent material. Protect pile driving equipment by parking it on plywood and covering it with plastic if precipitation is forecasted.

Store pile driving equipment on level ground and protect it from stormwater run-on when not in use. Use vegetable oil instead of hydraulic fluid if practicable.

13-4.03E(10) Concrete Curing

Do not overspray chemical curing compounds. Minimize the drift by spraying as close to the concrete as practicable. Do not allow runoff of curing compounds. Cover drainage inlets before applying the curing compound.

Minimize the use and discharge of water by using wet blankets or similar methods to maintain moisture when concrete is curing.

13-4.03E(11) Concrete Finishing

Collect and dispose of (1) water and solid waste from high-pressure water blasting and (2) sand and solid waste from sandblasting. Before sandblasting, cover drainage inlets within 50 feet of the sandblasting. Minimize the drift of dust and blast material by keeping the nozzle close to the surface of the concrete. If the character of the blast residue is unknown, test for hazardous materials and dispose of it.

Inspect the containment structures for concrete-finishing waste for damage before each day of use and before forecasted precipitation. Remove the liquid and solid waste from the containment structures after each work shift.

13-4.03E(12)–13-4.03E(15) Reserved

13-4.03F Sweeping

Sweep by hand or [wet sweeping](#) mechanical methods, such as vacuuming. Do not use mechanical kick brooms.

Sweep paved roads at construction entrance and exit locations and paved areas within the job site:

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SECTION 13

WATER POLLUTION CONTROL

1. During clearing and grubbing activities
2. During earthwork activities
3. During trenching activities
4. During pavement-structure construction activities
5. When vehicles are entering and leaving the job site
6. After soil-disturbing activities
7. After observing off-site tracking of material

Monitor paved areas and roadways within the project. Sweep within:

1. 1 hour if sediment or debris is observed during activities requiring sweeping
2. 24 hours if sediment or debris is observed during activities not requiring sweeping

Remove collected material, including sediment, from paved shoulders, drain inlets, curbs and dikes, and other drainage areas. You may stockpile collected material at the job site. Dispose of collected material at least once per week if stockpiled.

You may dispose of sediment within the job site collected during sweeping activities. Protect the disposal areas against erosion.

Keep dust to a minimum during street sweeping activities. Use water or a vacuum whenever dust generation is excessive or sediment pickup is ineffective.

13-4.03G Dewatering

Dewatering consists of discharging accumulated stormwater, groundwater, or surface water from excavations or temporary containment facilities.

Perform dewatering work as specified for the work items involved, such as a temporary ATS or dewatering and discharge.

If dewatering and discharging activities are not specified for a work item and you perform dewatering activities:

1. Conduct dewatering activities under Caltrans' *Field Guide for Construction Site Dewatering*.
2. Ensure any dewatering discharge does not cause erosion, scour, or sedimentary deposits that could impact natural bedding materials or otherwise violate Basin Plan water quality objectives or effluent limitations.
3. Discharge the water within the project limits avoiding the creation of runoff. Dispose of the water offsite with the Agency's approval if it cannot be discharged within project limits due to site constraints or contamination.
4. Do not discharge stormwater or nonstormwater that has an odor, discoloration other than sediment, an oily sheen, or foam on the surface. Immediately notify the Engineer upon discovering any such condition.

13-4.03H–13-4.03J Reserved

13-4.04 PAYMENT

Not Used

13-5 TEMPORARY SOIL STABILIZATION

13-5.01 GENERAL

Section 13-5 includes specifications for placing temporary soil stabilization materials.

Move-in and move-out for temporary erosion control includes:

1. Moving onto the job site when the Engineer determines an area is ready to receive temporary soil stabilization materials
2. Setting up all required personnel and equipment
3. Moving out all personnel and equipment when work in that area is complete

13-5.02 MATERIALS**13-5.02A General**

Tackifier, fiber, seed, and straw must comply with the specifications for the same materials in section 21-2.02 except section 21-2.01 does not apply.

Fiber for temporary hydraulic mulch, tacked straw, and hydroseed must be at least 50 percent wood fiber. The remaining percentage must be cellulose fiber, alternate fiber, or a combination of these fibers.

13-5.02B Erosion Control Blankets

An erosion control blanket must comply with the specifications for RECPs in section 21-2.02O except section 21-2.01 does not apply.

An erosion control blanket classified as long-term and nondegradable must be Class 8 RSP fabric.

13-5.02C Temporary Mulch

Temporary mulch must comply with the specifications for wood mulch in section 20.

13-5.02D Cementitious Binder

Cementitious binder must be:

1. Calcium sulfate hemihydrate
2. At least 85 percent pure
3. Functional for at least 365 days
4. Miscible with water and fiber
5. Nontoxic to aquatic organisms
6. Free from growth or germination-inhibiting factors
7. Nonflammable

13-5.02E Soil Binder

Soil binder must comply with the material specifications for tackifier.

13-5.02F Temporary Covers

A temporary cover must be a geosynthetic temporary cover, plastic sheeting, or a combination of both.

Plastic sheeting must be a 10-mil-thick, single-ply geomembrane material complying with ASTM D2103.

Restrainers for securing the cover fabric or plastic sheeting to a slope's surface must be one of the following types:

1. Gravel-filled bags roped together and spaced not more than 6 feet apart.
2. Wooden board and steel restrainer. The wooden board must be 2 by 4 inches, 8 feet long, and made from fir or pine. Steel reinforcing bars must be spaced not more than 4 feet apart along the wooden board.
3. Other authorized type.

Rope must be at least 3/8 inch in diameter and be biodegradable or nondegradable. Biodegradable rope must be made from sisal, manila, or other natural fiber. Nondegradable rope must be made from nylon, polypropylene, or other geosynthetic fiber.

The linear sediment barrier must comply with section 13-10.

13-5.02G Gravel-Filled Bags

A gravel-filled bag must:

1. Be a geosynthetic bag
2. Have inside dimensions from 24 to 32 inches long and from 16 to 20 inches wide
3. Have a bound opening sewn with yarn, bound with wire, or secured with a closure device
4. Weigh from 30 to 50 pounds when filled with gravel

Gravel for a gravel-filled bag must be from 3/8 to 3/4 inch in diameter and must be clean and free of clay balls, organic matter, and other deleterious materials.

13-5.02H–13-5.02J Reserved**13-5.03 CONSTRUCTION****13-5.03A General**

The Engineer authorizes the areas to receive soil stabilization materials by approving the placement of stakes or other suitable markers in increments of 1 ac or less.

Place temporary soil stabilization material within 24 hours after an area is ready to receive the material or before a forecasted storm event. Do not use a hydraulically applied material whenever:

1. Precipitation occurs
2. Water is standing on or moving across the soil surface
3. Soil is frozen
4. Air temperature is below 40 degrees F during the tackifier's curing period unless allowed under the tackifier manufacturer's instructions and authorized

13-5.03B Temporary Erosion Control Blankets

Place a temporary erosion control blanket as specified for RECPs in section 21-2.03O.

13-5.03C Temporary Mulch

Spread temporary mulch as specified for spreading wood mulch in section 20.

If an application rate is not shown, spread mulch to a uniform thickness of 2 inches.

13-5.03D Temporary Hydraulic Mulch

Apply temporary hydraulic mulch as specified for hydromulch in section 21-2.03D.

If application rates are not shown, apply temporary hydraulic mulch at the following rates:

1. Fiber at 2,000 lb/ac
2. Tackifier under the manufacturer's instructions for the slope, soil, and wind conditions

13-5.03E Temporary Bonded Fiber Matrix Hydraulic Mulch

Apply temporary bonded fiber matrix hydraulic mulch as specified for bonded fiber matrix in section 21-2.03H.

If an application rate is not shown, apply temporary bonded fiber matrix hydraulic mulch at the rate of 3,500 lb/ac.

13-5.03F Reserved**13-5.03G Temporary Cementitious Binder Hydraulic Mulch**

Apply temporary cementitious binder hydraulic mulch as specified for hydromulch in section 21-2.03D.

If application rates are not shown, apply temporary cementitious binder hydraulic mulch at the following rates:

1. Fiber at 2,000 lb/ac
2. Cementitious binder at 4,000 lb/ac

13-5.03H Temporary Tacked Straw

Apply temporary tacked straw as specified for straw in section 21-2.03G.

If application rates are not shown, apply temporary tacked straw at the following rates:

1. Straw at 2.0 tons/ac
2. Fiber at 2,000 lb/ac
3. Tackifier at the manufacturer's instructed rate for the slope, soil, and wind conditions

13-5.03I Temporary Hydroseed

Apply temporary hydroseed as specified for hydroseed in section 21-2.03D.

If application rates are not shown for fiber and tackifier, apply temporary hydroseed at the following rates:

1. Seed at the rate shown
2. Fiber at 2,000 lb/ac
3. Tackifier at the manufacturer's instructed rate for the slope, soil, and wind conditions

13-5.03J Temporary Soil Binder

Apply temporary soil binder as specified for hydromulch in section 21-2.03D.

If application rates are not shown, apply temporary soil binder at the manufacturer's instructed rate for the slope, soil, and wind conditions.

13-5.03K Temporary Covers

Install temporary-cover fabric as follows:

1. Place the fabric:
 - 1.1. Loosely on the slope with the longitudinal edges perpendicular to the slope contours
 - 1.2. On the upper portion of the slope to overlap the fabric on the lower portion of the slope
 - 1.3. On the side facing the prevailing wind to overlap the fabric on the downwind side of the slope
2. Anchor the perimeter edge of the fabric in key trenches.
3. Overlap the edges of the fabric by at least 2 feet.
4. Place restrainers at the overlap area and along the toe of the slope. Space the restrainers a maximum of 8 feet on center between the overlaps.
5. If anchor restraints are used, ensure that the leg of the steel reinforcing bar pierces the fabric and holds the wooden lath firmly against the surface of the slope.

Install a temporary linear sediment barrier to protect excavation and embankment slopes from run-on and concentrated flows of stormwater. Place the barrier parallel with the slope contour at the toe of the slope. Angle the last 6 feet of the barrier upslope at the downhill end of the run.

If you remove a temporary cover to perform other work, replace and resecure it within 1 hour of stopping work.

Maintain a temporary cover to minimize the exposure of slopes and prevent material movement beyond the linear sediment barrier.

Relocate and secure restrainers to keep the temporary cover in place. If a temporary cover breaks free, immediately resecure it.

Repair or replace a temporary cover if any of the following occurs:

1. Covered area becomes exposed or exhibits visible erosion
2. Erosion occurs between the joints or beneath the linear sediment barrier
3. Temporary cover becomes detached, torn, or unraveled

13-5.03L–13-5.03N Reserved**13-5.04 PAYMENT**

The payment quantity for temporary soil stabilization bid items paid for by the area is the area measured parallel with the ground surface not including the additional quantity used for overlaps.

~~Caltrans determines the cost for maintaining soil stabilization measures under section 9-1.04 and pays you 1/2 of that cost.~~

13-6 TEMPORARY SEDIMENT CONTROL**13-6.01 GENERAL**

Section 13-6 includes specifications for installing temporary sediment control.

Temporary linear sediment barriers must comply with section 13-10.

13-6.02 MATERIALS**13-6.02A General**

An erosion control blanket must comply with section 21-2.02O(4) except section 21-2.01 does not apply.

Fiber rolls, rope, stakes, gravel-filled bags, and foam barriers must comply with section 13-10.02.

13-6.02B Rigid Plastic Barriers

A rigid plastic barrier must:

1. Have an integrated filter
2. Have a formed outer jacket of perforated HDPE or polyethylene terephthalate
3. Have a flattened tubular-shaped cross section
4. Be made from virgin or recycled materials
5. Be free of biodegradable filler materials that degrade the physical or chemical characteristics of the completed filter core or outer jacket
6. Have a length of at least 4 feet per unit
7. Have the ability to interlock separate units into a long barrier such that water does not flow between the units
8. Comply with the requirements shown in the following table:

Quality characteristic	Test method	Requirement
Grab tensile strength of outer jacket material (min, lb/sq in each direction)	ASTM D4632 ^a	4,000
Break strength of outer jacket (lb/sq in)	ASTM D4632 ^a	1,300
Permittivity of filter core (min, 1/sec)	ASTM D4491	0.38
Flow rate of filter core (gpm per sq ft)	ASTM D4491	100–200
Filter core aperture size (max, microns)	--	425
UV stability of outer jacket and filter core (min, percent tensile strength after 500 hours, xenon-arc lamp and water spray weathering method)	ASTM D4355	90

^aYou may use other appropriate test method for the specific polymer.

For an inlet with a curb opening but no grate, the rigid plastic barrier must be sized to fit the opening and have:

1. Horizontal flap of at least 6 inches with an under-seal gasket to prevent underflows
2. High-flow bypass
3. Vertical height of at least 7 inches after installation

For a grated inlet without a curb opening, the rigid plastic barrier must be sized to fit the inlet and:

1. Cover the grate by at least 2 inches on each side and have an under-seal gasket to prevent underflows
2. Have a high-flow bypass
3. Have a vertical height of at least 1.5 inches after installation

For a grated inlet with a curb opening, the rigid plastic barrier must be sized to fit and have:

1. Horizontal flap that covers the grate by at least 2 inches on the 3 sides away from the curb opening and must have an under-seal gasket to prevent underflows
2. High-flow bypass
3. Section that covers at least 5 inches vertically above the flow line of the curb opening after installation

13-6.02C Sediment Filter Bags

Each sediment filter bag must be sized to fit the catch basin or drainage inlet and have a high-flow bypass.

A sediment filter bag may include a metal frame. If the sediment filter bag does not have a metal frame and is deeper than 18 inches, it must include lifting loops, dump straps, and a restraint cord to keep the sides of the bag away from the walls of the catch basin.

13-6.02D–13-6.02F Reserved**13-6.03 CONSTRUCTION****13-6.03A General**

Remove sediment deposits if the sediment exceeds 1 inch in depth from the surface of an erosion control blanket.

Remove sediment from a Type 2 sediment trap of a temporary inlet if the volume has been reduced by approximately 1/2.

Remove sediment from a sediment filter bag if it becomes full or if the restraint cords are no longer visible. Empty a sediment filter bag:

1. Without a metal frame by placing no. 8 steel reinforcing bars through the lifting loops and lifting the filled bag from the drainage inlet
2. With a metal frame by lifting the metal frame from the drainage inlet

Rinse the sediment filter bag before replacing it at the drainage inlet. Do not allow the rinse water to enter a drainage inlet or waterway.

If you place the removed sediment within the job site, stabilize the sediment deposits to prevent erosion.

13-6.03B Temporary Check Dams

Before placing a temporary check dam, remove obstructions, including rocks, clods, and debris greater than 1 inch in diameter from the ground.

If a temporary check dam is to be placed in the same area as an erosion control blanket, install the blanket before placing the dam.

Place a temporary check dam approximately perpendicular to the centerline of the ditch or drainage line. Install the dam with enough spillway depth to prevent flanking of a concentrated flow around its ends. Install a Type 1 or Type 2 dam if the ditch is unlined and a Type 2 dam if the ditch is lined with concrete or asphalt concrete.

For a Type 1 temporary check dam:

1. Secure the fiber rolls with rope and notched wood stakes.
2. Drive the stakes into the soil until the notch is even with the top of the fiber roll.
3. Lace rope between the stakes and over the fiber roll. Knot the rope at each stake.
4. Tighten by driving the stakes further into the soil and forcing the fiber roll against the surface of the ditch or drainage line.

Place a Type 2 temporary check dam as a single layer of gravel-filled bags, placed end-to-end to eliminate gaps. If you need to increase the height of the dam, add more layers of gravel-filled bags. Stack the bags in the upper row to overlap the joints in the lower row. Stabilize the rows by adding more rows of bags in the lower layers.

13-6.03C Temporary Drainage Inlet Protection

Provide temporary drainage inlet protection around drainage inlets as changing conditions require. The drainage inlet protection must be Type 1, Type 2, Type 3A, Type 3B, Type 4A, Type 4B, ~~Type 5~~, Type 6A, Type 6B, or a combination of these as needed for the surrounding conditions.

For drainage inlet protection in paved or unpaved areas:

1. Prevent runoff ponds from encroaching onto the traveled way or overtopping the curb or dike. Use a linear sediment barrier to redirect runoff and control ponding.
2. Clear the area around each drainage inlet of obstructions, including rocks, clods, and debris greater than 1 inch in diameter, before installing the drainage inlet protection.
3. Install the linear sediment barrier upslope of the existing drainage inlet and parallel with the curb, dike, or flow line to prevent sediment from entering the drainage inlet.

If gravel-filled bags are used for Type 3A and Type 3B temporary drainage inlet protection, place the gravel-filled bags end-to-end to eliminate gaps. Stack the bags such that the upper row overlaps joints in the lower row. Arrange the bags to create a spillway by removing 1 or more gravel-filled bags from the upper layer.

Place fiber rolls over the erosion control blanket for Type 4A temporary drainage inlet protection.

Place the barrier to provide a tight joint with the curb or dike. Cut the cover fabric or jacket to ensure a tight fit.

If a rigid sediment barrier is used for Type 6A or Type 6B temporary drainage inlet protection at a grated inlet without a curb opening, place the barrier using a gasket to prevent runoff from flowing under the barrier. Secure the barrier to the pavement with nails and adhesive, gravel-filled bags, or a combination of both.

~~Install a sediment filter bag for Type 5 temporary drainage inlet protection as follows:~~

- ~~1. Remove the drainage inlet grate.~~
- ~~2. Place the sediment filter bag in the opening.~~
- ~~3. Replace the grate to secure the sediment filter bag in place.~~

13-6.03D Reserved

13-6.03E Temporary Fiber Rolls

Install a temporary fiber roll as specified for installing fiber rolls in section 21-2.03P.

13-6.03F Temporary Gravel Bag Berms

Install a temporary gravel bag berm under section 13-10.03C.

13-6.03G Rigid Plastic Barriers

Secure a rigid plastic barrier to:

1. Pavement with 1-inch concrete nails with 1-inch washers and solvent-free adhesive, gravel-filled bags, or a combination of both
2. Soil with 6-inch nails with 1-inch washers and wood stakes

13-6.03H–13-6.03J Reserved

13-6.04 PAYMENT

The payment quantity for temporary sediment control bid items paid for by the length is the length measured along the centerline of the installed material.

The payment quantity for temporary fiber roll does not include the additional quantity used for overlaps.

The Agency does not pay for the relocation of temporary drainage inlet protection during work progress.

~~Caltrans determines the cost for maintaining sediment control measures under section 9-1.04 and pays you 1/2 of that cost.~~

13-7 TEMPORARY TRACKING CONTROL**13-7.01 GENERAL****13-7.01A General**

Section 13-7 includes specifications for limiting and removing sediment and debris tracked onto roadway surfacing.

13-7.01B Materials

Not Used

13-7.01C Construction

Do not allow soil, sediment, or other debris that is tracked onto the surfacing to enter storm drains, open drainage facilities, and watercourses. Remove any material tracked onto the surfacing within 6 hours.

13-7.01D Payment

Not Used

13-7.02 STREET SWEEPING**13-7.02A General****13-7.02A(1) Summary**

Section 13-7.02 includes specifications for sweeping streets.

13-7.02A(2) Definitions

Reserved

13-7.02A(3) Submittals

At least 5 business days before starting clearing and grubbing, earthwork, or any other activity with the potential for tracking sediment or debris, submit the number and type of street sweepers that will be used on the project for each activity.

Keep and submit records of street sweeping activities, including sweeping times, sweeping locations, and the quantity of collected material.

13-7.02A(4) Quality Assurance

Reserved

13-7.02B Materials

Not Used

13-7.02C Construction

Use a wet mechanical street sweeper with vacuum.

~~Use one of the following types of street sweepers:~~

- ~~1. Mechanical sweeper followed by a vacuum-assisted sweeper~~
- ~~2. Vacuum-assisted, dry, waterless, sweeper~~
- ~~3. Regenerative air sweeper~~

Street sweeping does not void the requirements for residue collection included in other work activities, such as grooving, grinding, or asphalt concrete planing.

Sweep streets as specified for sweeping in section 13-4.03F except use a street sweeper.

At least 1 street sweeper must be at the job site at all times when street sweeping work is required. The street sweeper must be in good working order.

13-7.02D Payment

Not Used

13-7.03 TEMPORARY CONSTRUCTION ROADWAYS AND ENTRANCES

Not Used

13-8 TEMPORARY ACTIVE TREATMENT SYSTEMS

Not Used

13-9 TEMPORARY CONCRETE WASHOUTS**13-9.01 GENERAL****13-9.01A Summary**

Section 13-9 includes specifications for installing temporary concrete washouts.

You may use any of the following systems for a temporary concrete washout:

1. Temporary concrete washout facility
2. Portable temporary concrete washout
3. Temporary concrete washout bin

13-9.01B Definitions

Reserved

13-9.01C Submittals

At least 5 business days before starting concrete activities, submit an informational submittal that includes:

1. Location of each concrete washout
2. Name and location of the off-site disposal site to receive the concrete waste
3. Copy of the permit issued by the RWQCB for the off-site commercial disposal site
4. Copy of the permit issued by the state or local agency with jurisdiction over a disposal site located outside of the State

Retain and submit tracking records for the disposal of concrete waste as an informational submittal.

Submit a certificate of compliance for (1) the fabric bag for gravel-filled bags and (2) the plastic liner.

13-9.01D Quality Assurance

Reserved

13-9.02 MATERIALS**13-9.02A General**

The sign for a concrete washout must comply with section 12-3.11B(3) except the sign panel may be plywood. The sign panel must be at least 4 by 2 feet. The sign legend must read Concrete Washout in at least 6-inch-high black letters on a white background.

13-9.02B Temporary Concrete Washout Facilities

Stakes for a temporary concrete washout facility must comply with section 13-10.02C.

Straw bales for a temporary concrete washout facility must comply with section 13-10.02H.

Gravel-filled bags for a temporary concrete washout facility must comply with section 13-5.02G.

The plastic liner for a temporary concrete washout facility must be:

1. New single-ply polyethylene sheeting without seams or overlapping joints
2. At least 10 mils thick
3. Free of holes, punctures, tears, or other defects

13-9.02C Portable Temporary Concrete Washouts

A portable temporary concrete washout must be a commercially available, watertight container with enough capacity to contain all liquid and concrete waste generated by washout activities without seepage or spills and be:

1. At least 55 gallons in capacity.
2. Labeled for exclusive use as a concrete waste and washout facility. *Concrete Washout* must be stenciled in 3-inch-high black letters on a white background with the top of the letters placed 12 inches from the top of the container.

13-9.02D Temporary Concrete Washout Bins

A temporary concrete washout bin must be a commercially available, watertight container with enough capacity to contain all liquid and concrete waste generated by washout activities without seepage or spills and be:

1. At least 5 cubic yards in capacity
2. Roll-off type with or without folding steel ramps
3. Labeled for exclusive use as a concrete waste and washout facility

13-9.02E–13-9.02G Reserved**13-9.03 CONSTRUCTION**

Place a concrete washout at the job site:

1. Before starting concrete placement activities
2. In the immediate area of concrete work where authorized
3. No closer than 50 feet from any storm drain inlet, open drainage facility, ESA, or watercourse
4. Away from traffic or public access areas

Install a concrete washout sign adjacent to each concrete washout location.

Use a concrete washout to collect:

1. Washout from concrete delivery trucks
2. Slurries containing concrete or asphalt from saw cutting, coring, grinding, grooving, and hydrodemolition
3. Concrete waste from mortar mixing stations

Do not fill a concrete washout higher than 6 inches below the upper rim.

Dispose of concrete waste within 2 business days after a concrete washout becomes full. Dispose of concrete waste from a concrete washout at a plant licensed to receive solid concrete waste, liquid concrete waste, or both.

Relocate a portable temporary concrete washout or bin as needed for concrete work. The Agency does not pay for relocating a portable temporary concrete washout or bin.

Secure a portable temporary concrete washout or bin to prevent spilling concrete waste when relocating or transporting it within the job site. If you spill concrete waste, clean up the spilled material and place it back into the concrete washout unit.

13-9.04 PAYMENT

Not Used

13-10 TEMPORARY LINEAR SEDIMENT BARRIERS**13-10.01 GENERAL****13-10.01A Summary**

Section 13-10 includes specifications for installing temporary linear sediment barriers.

SECTION 13

WATER POLLUTION CONTROL

13-10.01B Definitions

Reserved

13-10.01C Submittals

Submit a certificate of compliance for:

1. Fiber rolls
2. Silt fence fabrics
3. Sediment filter bags
4. Foam barriers
5. Fabric for gravel-filled bags

If you substitute steel wire staples with an alternative attachment device, submit a sample of the device at least 5 business days before its installation.

13-10.01D Quality Assurance

Reserved

13-10.02 MATERIALS

13-10.02A General

Stakes, ropes, and staples must comply with section 21-2.02R except section 21-2.01 does not apply.

13-10.02B Fiber Rolls

A fiber roll must comply with section 21-2.02P except a fiber roll for a large sediment barrier must:

1. Have a diameter from 18 to 22 inches
2. Be at least 8 feet long
3. Weigh at least 6.5 lb/ft

13-10.02C Posts

Each post must comply with the specifications for a post for a temporary high-visibility fence except:

1. Post length must be at least 4 feet except for a temporary reinforced silt fence that must have a post length of at least:
 - 1.1. 6 feet for a Type 1 installation
 - 1.2. 5 feet for a Type 2 installation
2. Steel is not allowed for a post for a temporary large sediment barrier

13-10.02D High-Visibility Fabric

The high-visibility fabric must comply with the specifications for fabric for a temporary high-visibility fence.

13-10.02E Wire Mesh

Wire mesh for a temporary reinforced silt fence must:

1. Comply with section 80-2.02E
2. Be fabricated from at least 14-gauge horizontal and vertical wires welded at each intersection
3. Have a maximum opening of 2 inches wide by 4 inches high
4. Be supplied in 50-foot rolls

13-10.02F Wire

Wire for guy wires and tie wires for a temporary reinforced silt fence must be 16-gauge iron or steel.

13-10.02G Anchors

Anchors for a temporary reinforced silt fence must be fabricated from no. 4 steel reinforcing bar.

13-10.02H Straw Bales

Straw for a straw bale must comply with section 21-2.02H.

A straw bale must be:

1. At least 14 inches wide, 18 inches high, 36 inches long, and weigh at least 50 lb.
2. Composed entirely of vegetative matter except for the binding material.
3. Bound by wire, nylon, or polypropylene string. Do not use jute or cotton binding. Baling wire must be at least 16 gauge. Nylon or polypropylene string must be approximately 0.08 inch in diameter with 80 lb of breaking strength.

13-10.02I Foam Barriers

A foam barrier must have:

1. Urethane foam-filled core
2. Geosynthetic fabric cover and flap
3. Triangular, circular, or square cross section
4. Vertical height of at least 5 inches after installation
5. Horizontal flap at least 8 inches in width
6. Length of at least 4 feet per unit
7. Ability to interlock separate units into a long barrier such that water will not flow between units

The geosynthetic fabric cover and flap for a foam barrier must comply with the requirements shown in the following table:

Quality characteristic	Test method	Requirement
Grab breaking load in each direction, 1-inch grip (min, lb)	ASTM D4632	200
Apparent elongation in each direction (min, %)	ASTM D4632	15
Water flow rate (average roll value, gpm/sq ft)	ASTM D4491	100–150
Permittivity (min, 1/sec)	ASTM D4491	0.05
Apparent opening size (max average roll value, US standard sieve size)	ASTM D4751	40
UV resistance (min, percent retained grab breaking load at 500 hours)	ASTM D4355	70

13-10.02J Gravel-filled Bags

Gravel-filled bags for a temporary gravel bag berm must comply with section 13-5.02G.

13-10.02K–13-10.02M Reserved

13-10.03 CONSTRUCTION

13-10.03A General

Before installing a temporary linear sediment barrier, remove obstructions, including rocks, clods, and debris greater than 1 inch in diameter, from the ground.

Maintain a temporary linear sediment barrier to provide sediment-holding capacity and to reduce concentrated flow velocities.

Repair or adjust the barrier if rills or other evidence of concentrated runoff occur beneath the barrier.

Repair or replace split, torn, or unraveled material. Add or replace posts, stakes, or fasteners as needed to prevent sagging or slumping.

Reattach any barrier that becomes detached or dislodged from the pavement.

Repair a split or torn rigid plastic barrier with 16-gauge galvanized steel wire or UV-stabilized cable ties from 5 to 7 inches in length.

Remove sediment deposits, trash, and other debris as needed or ordered.

Remove sediment deposits if the sediment exceeds 1/3 of the height above the ground behind a barrier.

If you place the removed sediment deposits within the job site, stabilize the sediment deposits to prevent erosion.

Place gravel-filled bags behind Type K temporary railing if used within a shoulder area.

13-10.03B Temporary Fiber Rolls

Install temporary fiber rolls as specified for installing fiber rolls in section 21-2.03P.

13-10.03C Temporary Gravel Bag Berms

Place gravel-filled bags end-to-end to eliminate gaps in a temporary gravel bag berm. Place the bags approximately parallel with the slope contour. Angle the last 6 feet upslope at the downhill end of the run. Stack the bags such that the upper row overlaps the joints in the lower row.

Add layers of gravel-filled bags to increase the height of a temporary gravel bag berm if needed. Stack the bags in the upper row to overlap the joints in the lower row. Stabilize the rows by adding rows of bags in the lower layers.

13-10.03D Temporary Large Sediment Barriers

Install a temporary large sediment barrier as follows:

1. Place a single row of fiber rolls end-to-end, approximately parallel with the slope contour. For any 20-foot section of fiber roll, do not allow the fiber roll to vary by more than 5 percent from level.
2. Place the fiber rolls in a furrow that is from 6 to 8 inches deep.
3. Secure the fiber rolls with wood stakes 4 feet apart.
4. Place a stake 18 inches from each end of each fiber roll.
5. Drive the stakes into the soil such that the top of the stakes are less than 2 inches above the top of the fiber rolls.
6. Angle the last 6 feet upslope at the downhill end of the run.

13-10.03E Temporary Reinforced Silt Fences

Place a temporary reinforced silt fence parallel with the slope contour. For any 50-foot section of reinforced silt fence, do not allow the elevation at the base of the fence to vary by more than 1/3 of the fence height.

Install a temporary reinforced silt fence as follows:

1. Dig a 6-inch-deep trench.
2. Place the wire mesh and the bottom of the silt fence fabric in the trench.
3. Place posts on the downhill side of the fabric and wire mesh.
4. Attach the silt fence fabric to the wire mesh with tie wires or locking plastic fasteners along the length of the fence at not more than 3-foot horizontal spacing and from top to bottom at not more than 8-inch vertical spacing.
5. Backfill the trench with soil by hand or mechanical tamping to secure the silt fence fabric and the wire mesh in the trench.
6. Attach guy wires and anchors at each post. Install at least 2 anchors and guy wires at angle points and end posts.

Connect sections of temporary reinforced silt fence as follows:

1. Join separate sections to form reaches not more than 500 feet without openings.
2. Secure the end posts of each section by wrapping the tops of the posts with at least 2 wraps of 16-gauge tie wire.

If temporary reinforced silt fence Type 1 is shown, attach high-visibility fabric to the steel posts with tie wires or locking plastic fasteners.

13-10.03F Temporary Silt Fences

Construct a temporary silt fence with silt fence fabric, posts, and fasteners assembled at the job site or with prefabricated silt fence.

If prefabricated silt fence is used, attach the fabric to the posts by inserting the posts into the sewn pockets. If the fence is assembled at the job site:

1. Fasten the fabric to the posts with staples or nails if wood posts are used
2. Fasten the fabric to the posts with tie wires or locking plastic fasteners if steel posts are used
3. Space the fasteners no more than 8 inches apart

Place a temporary silt fence parallel with the slope contour. For any 50-foot section of temporary silt fence, do not allow the base elevation of the fence to vary by more than 1/3 of the height of the fence above the ground.

Install a temporary silt fence as follows:

1. Place the bottom of the fabric in a 6-inch-deep trench.
2. Secure it with the posts placed on the downhill side of the fabric.
3. Backfill the trench with soil and compact by hand or mechanical methods to secure the fabric in the trench.

Connect sections of a temporary silt fence as follows:

1. Join separate sections to form reaches not more than 500 feet without openings.
2. Secure the end posts of each section by wrapping the tops of the posts with at least 2 wraps of 16-gauge tie wire.

You may install the silt fence by mechanically pushing the silt fence fabric vertically into the soil. Mechanically installed fabric must not slip out of the soil or allow sediment to pass under it.

13-10.03G Temporary Straw Bale Barriers

Install a temporary straw bale barrier as follows:

1. Place a single row of straw bales end-to-end and parallel with the slope contour. For any 20-foot section of straw bale barrier, do not allow it to vary by more than 5 percent from level.
2. Place straw bales in a trench or key them into the slope. Place the bales such that the binding wire or string does not come in contact with the soil. Use wood or metal posts as stakes.
3. Secure each straw bale with 2 stakes. The 1st stake in each bale must be driven toward the previously laid bale to force the bales together.
4. Drive the stakes into the soil such that the top of the stake is less than 2 inches above the top of the straw bale.
5. Angle the last 6 feet upslope at the downhill end of the run.

13-10.03H Temporary Foam Barriers

Secure a foam barrier to:

1. Pavement with (1) 1-inch concrete nails, 1-inch washers, and solvent-free adhesive, (2) gravel-filled bags, or (3) a combination of both
2. Soil with 6-inch nails and 1-inch washers

Secure the barrier with 2 nails at the connection points where barriers overlap. Do not pierce the barrier's core with nails.

13-10.03I Temporary Earthen Berms

Construct a temporary earthen berm with native soil or selected material at least 8 inches high by 36 inches wide. Compact it by hand or mechanical methods.

13-10.03J–13-10.03L Reserved

13-10.04 PAYMENT

Not Used

13-11 RESERVED

13-12 TEMPORARY CREEK DIVERSION SYSTEMS

Reserved

13-13–13-15 RESERVED

14 ENVIRONMENTAL STEWARDSHIP

14-1 GENERAL

14-1.01 GENERAL

Section 14 includes specifications relating to environmental compliance and environmental resource management.

14-1.02 ENVIRONMENTALLY SENSITIVE AREA

If an ESA is shown, the boundaries shown are approximate. The Agency marks the exact boundaries on the ground.

Do not enter an ESA unless authorized.

If an ESA is breached, immediately:

1. Stop all work within 60 feet of the ESA boundary
2. Secure the area
3. Notify the Engineer

If an ESA is damaged, the Agency determines the necessary remediation and the party to perform the work. The Agency deducts the cost for this work.

14-1.03 SUSTAINABLE DESIGN STRATEGY

Comply with Alameda County Green Building Ordinance.

Pursue sustainable design goals by implementing the following strategies to the maximum extent feasible:

1. Water Conservation: minimize use of potable water and use recycled water for dust control and irrigation operations
2. Energy Conservation: use energy-efficient materials and equipment, recycled paper, and recycled motor oil where applicable.
3. Efficient Materials Use:
 1. Use recycled-content products and materials such as AC, AB, dirt, rocks, plastics, traffic control signs, sign parts, etc.
 2. Use locally manufactured materials by using materials manufactured in the US and materials sold by vendors located in Alameda County.
 3. Recycle/salvage demolition and construction waste by reusing or recycling 75% of asphalt concrete, concrete, and earth debris; 50% of total of all other debris; and packaging materials brought to the job site.

You must complete, sign, date and submit the Sustainable Design Guide Project Checklist (Information Handout F), before the project will be accepted as complete.

14-1.04 RECYCLED PRODUCT PROGRAM

14-1.04A General

Comply with Alameda County Recycled Product Purchase Preference Program. Use products with post-consumer recycled content to the greatest extent feasible.

14-1.04B Definitions

recycled product: A product that contains the highest amount of postconsumer materials practicable or, when postconsumer material is impracticable for a specific type of product, containing substantial amount of recovered material.

postconsumer material: A finished material which would have been disposed of as a solid waste, having completed its life cycle as a consumer item, and does not include manufacturing wastes.

secondary (recovered) material: Fragments of finished products or finished products of a manufacturing process, which has converted a resource into a commodity of real economic

value, and includes postconsumer waste, but does not include excess virgin resources of the manufacturing process.

reused or remanufactured product: any product, good, material or supply which has been diverted from the supply of discarded materials for refurbishing and marketing said product, good, material or supply without substantial change to its original form.

14-1.04C Recycled Content Standards

It is the policy of Alameda County to purchase products containing the highest practicable amount of recycled content, preferably postconsumer material, as long as product performance is not jeopardized and products are available within a reasonable period of time.

14-1.04D Certification Form Requirement

Submit Agency recycled content certification form when the a contract submittal contains products with recycled content. The certification form must state the minimum percentage of postconsumer material and secondary (recovered) material by total product weight, or fiber weight for paper.

Metal products are excluded from recycled content certification.

14-1.04E Recycled Paper Policy

You are encouraged, whenever practicable, to use recycled paper for the production of all printed and photocopied documents related to the fulfillment of the Contract and to identify the use of such on document cover pages.

14-1.05–14.1.06 RESERVED

14-2 CULTURAL RESOURCES

14-2.01 GENERAL

Section 14-2 includes specifications relating to cultural resources.

14-2.02 DEFINITIONS

archaeological monitoring area: Area within or near construction limits where access is allowed but work is subject to archaeological monitoring.

archaeological resources: Remains of past human activity, including historic and prehistoric material such as tools and tool fragments, hearth and food remains, structural remains, and human remains.

14-2.03 ARCHAEOLOGICAL RESOURCES

14-2.03A General

If archaeological resources are discovered within or near construction limits, do not disturb the resources and immediately:

1. Stop all work within a 60-foot radius of the discovery
2. Secure the area
3. Notify the Engineer

With regard to the discover of any bones which are or may be human remains, if for any reason the Engineer cannot be notified with four hours, notify the Alameda County Coroner of the discovery.

The Agency investigates the discovery. Do not move archaeological resources or take them from the job site. Do not resume work within the radius of discovery until authorized.

If ordered, furnish resources to assist in the investigation or recovery of archaeological resources. This work is change order work.

14-2.03B Archaeological Monitoring Area

If an archaeological monitoring area is shown within, near, or straddling the job site, the boundaries shown are approximate.

SECTION 14

ENVIRONMENTAL STEWARDSHIP

The Agency assigns an archaeological monitor to observe work activities within the archaeological monitoring area. Do not work within the area unless the archaeological monitor is present.

The Engineer and the archaeological monitor will conduct a field review with you at least 5 business days before the start of job site activities. The Agency marks the exact boundaries of the archaeological monitoring area on the ground.

If a high-visibility fence is shown, install it or other authorized enclosure to protect the area and define its boundaries before starting other job site activities.

Submit a schedule showing the days and hours that work will be performed in an archaeological monitoring area at least 5 business days before starting work in the monitoring area. Submit an updated schedule at least 5 business days before any changed work day.

14-2.04 HISTORIC STRUCTURES

Reserved

14-2.05–14-2.10 RESERVED

14-3 COMMUNITY IMPACTS AND ENVIRONMENTAL JUSTICE

Reserved

14-4 NATIVE AMERICAN CONCERNS

Reserved

14-5 AESTHETICS

Reserved

14-6 BIOLOGICAL RESOURCES

14-6.01 GENERAL

Section 14-6 includes specifications relating to biological resources.

Comply with all rules and regulations of the Department of Food and Agriculture, the Department of Health, the Department of Industrial Relations and all other agencies that govern the use of pesticides.

14-6.02 DEFINITIONS

biological resource incident: Take of a regulated species or violation of a biological resource PLAC.

invasive species: Species whose presence in the environment causes economic or environmental harm or harm to human health.

listed species: Species listed as threatened or endangered under (1) the federal Endangered Species Act of 1973, 16 USC § 1531 et seq., (2) California Endangered Species Act, Fish & Game Code §§ 2050–2115.5, or (3) both.

listed salmonid: Salmon, steelhead, or trout that are listed as a threatened or endangered species under the federal Endangered Species Act or listed or proposed as a threatened or endangered species under the California Endangered Species Act.

nongame birds: Birds identified in the Fish and Game Code as nongame birds.

permitted biological activities: Monitoring, surveying, or other practices that require a take permit and project-specific permission from the US Fish and Wildlife Service or NOAA Fisheries or a take permit or memorandum of understanding from the Department of Fish and Wildlife.

pesticide: Any substance or mixture of substances intended for preventing, repelling, mitigating, or destroying weeds, insects, diseases, rodents, or nematodes and any substance or mixture of substances intended for use as a plant regulator, defoliant or desiccant. This includes but is not limited to herbicides, insecticides, fungicides, rodenticides, germicides, nematocides, bactericides, inhibitors, fumigants, defoliants, desiccants, soil sterilants, and repellents.

protective radius: Minimum distance between construction activities and a regulated species.

regulated species: Species protected by one or a combination of the following:

1. Federal Endangered Species Act of 1973, 16 USC § 1531 et seq.
2. California Endangered Species Act, Fish & Game Code §§ 2050–2115.5
3. Fish & Game Code §§ 1600–1616
4. National Environmental Policy Act, 42 USC § 4321 et seq.
5. California Environmental Quality Act, Pub Res Code § 21000 et seq.
6. Other law or regulation governing activities that affect species or their habitats

routine biological activities: Biological monitoring, surveying, or other activity that does not require a take permit from the US Fish and Wildlife Service or NOAA Fisheries or a take permit or memorandum of understanding from the Department of Fish and Wildlife.

service-approved biologist: Biologist whose activities must be approved by a state or federal agency as provided in PLACs.

take: Legal definition regarding harm to listed species as defined in 16 USC § 1532 and Fish & Game Code § 86.

take permit: Permit granted by the US Fish and Wildlife Service or the NOAA Fisheries that allows take of federal-listed species under 16 USC § 1539 or by the Department of Fish and Wildlife that allows take of state-listed species under Fish & Game Code § 2081.

temporary wetland protection mat: Device placed temporarily on a wetland to minimize damage to the soils and habitat.

14-6.03 SPECIES PROTECTION

Not Used

14-6.04 WETLAND PROTECTION

Prevent permanent damage and minimize temporary damage to wetlands when any motorized equipment or vehicles cross the wetlands.

You may use temporary wetland protection mats to cross wetlands if allowed by regulatory agencies.

14-6.05–14-6.10 RESERVED

14-7 PALEONTOLOGICAL RESOURCES

14-7.01 GENERAL

Section 14-7 includes specifications relating to paleontological resources.

14-7.02 DEFINITIONS

paleontological resources: Fossils and the deposits they are found in. Fossils are evidence of ancient life preserved in sediments and rock. Examples of paleontological resources are the remains of (1) animals, (2) animal tracks, (3) plants, and (4) other organisms. Archaeological resources are not paleontological resources. Fossils found within an archaeological resource are generally considered archaeological not paleontological resources.

paleontological resources mitigation: Monitoring for fossils and salvage or in-place stabilization if fossils are found.

14-7.03 DISCOVERY OF UNANTICIPATED PALEONTOLOGICAL RESOURCES

If unanticipated paleontological resources are discovered at the job site, do not disturb the resources and immediately:

1. Stop all work within a 60-foot radius of the discovery
2. Secure the area
3. Notify the Engineer

The Agency investigates the discovery and modifies the dimensions of the secured area if needed. Do not move paleontological resources or take them from the job site. Do not resume work within the radius of discovery until authorized.

14-7.04 PALEONTOLOGICAL RESOURCES MITIGATION

Reserved

14-7.05–14.7.08 RESERVED**14-8 NOISE AND VIBRATION****14-8.01 GENERAL**

Section 14-8 includes specifications for controlling noise and vibration.

14-8.02 NOISE CONTROL

Control and monitor noise resulting from work activities.

Comply with all local sound control and noise level rules, regulations and ordinances that apply to any work performed.

Ensure that each internal combustion engine, used for any purpose on the job or related to the job is equipped with a muffler of a type recommended by the manufacturer. No combustion engine is allowed to operate on the Project without such a muffler.

Do not exceed 86 dBA Lmax at 50 feet from the job site from 9:00 p.m. to 6:00 a.m.

14-8.03–14.8.06 RESERVED**14-9 AIR QUALITY****14-9.01 GENERAL**

Section 14-9 includes specifications relating to air quality.

14-9.02 AIR POLLUTION CONTROL

Comply with air-pollution-control rules, regulations, ordinances, and statutes that apply to work performed under the Contract, including those provided in Govt Code § 11017 (Pub Cont Code § 10231).

All containers of paint, thinner or solvent must be labeled to indicate that the contents are in compliance.

Do not dispose of material by burning.

14-9.03 AIR MONITORING

Reserved

14-9.04–14.9.10 RESERVED**14-10 SOLID WASTE DISPOSAL AND RECYCLING****14-10.01 GENERAL**

Section 14-10 includes specifications for managing solid waste.

Dispose of or recycle solid waste from the job site.

Do not allow litter, trash, or debris to accumulate anywhere on the site, including storm drain grates, trash racks, and ditch lines. Pick up and remove litter, trash, and debris from the job site at least once a week. Do not perform solid waste management in the median area unless there is construction activity present. Perform solid waste management monthly during the plant establishment period. The WPC manager must monitor solid waste storage and disposal procedures.

If ordered, remove solid waste from illegal dumping on the project site. This work is change order work. Illegal dumping is:

1. Third party nonhazardous residential or commercial waste
2. Greater than 1.0 cubic yard per event

If practicable, recycle nonhazardous waste and excess material. If recycling is not practicable, dispose of the material.

Information regarding recyclable materials and available facilities can be obtained by calling the Alameda County recycling hotline at (877) 786-7927 or from the Alameda County Waste Management Authority website: www.stopwaste.org.

The following construction debris will be generated on this project:

1. Asphalt: Asphalt concrete may include pavement reinforcing fabric
2. Concrete: Portland cement concrete
3. Earth Debris: dirt or clean fill defined as natural clean material indigenous to surrounding area
4. Tile/Masonry: bricks, cinder blocks, tiles, etc.
5. Plant and Tree Trimmings: plants, shrubs, bushes, tree trimmings, such as branches, twigs, etc.
6. Plastic: Poly-Vinyl Chloride (PVC) pipes, plastic fences, etc.
7. Plate Glass: non-container glass such as windows or scraps of glass
8. Rock/Gravel: clean rock/gravel
9. Scrap Metal: metal posts, corrugated metal pipes, inlet grates, chain link fences, etc.
10. Tire and Rubber Scrap: tires, rubber moldings, etc.
11. Trees: large de-limbed trees, whole logs only
12. Wood: includes both treated and untreated wood

The Notice to Proceed will not be issued unless the Management Plan (CND Form 1A and 1B) is submitted and approved.

Furnish enough closed-lid dumpsters of sufficient size to contain the solid waste generated by work activities. When waste reaches the fill line, empty the dumpsters. Dumpsters must be watertight. Do not wash out dumpsters at the job site. Furnish additional containers and more frequent pickup during the demolition phase of construction.

Solid waste includes:

1. Brick
2. Mortar
3. Timber
4. Metal scraps
5. Sawdust
6. Pipe
7. Electrical cuttings
8. Nonhazardous equipment parts
9. Styrofoam and other packaging materials
10. Vegetative material and plant containers from highway planting
11. Litter and smoking material, including litter generated by the public
12. Other trash and debris

Furnish and use trash containers in the job-site yard, field trailers, and locations where workers gather for lunch and breaks.

The Notice to Proceed will not be issued unless the Management Plan (CND Form 1A and 1B) is submitted and approved.

Submit all weight tickets documenting materials recycled or landfilled.

14-10.01A Construction and Demolition Debris Ordinance

Comply with the diversion requirements of the Alameda County Construction and Demolition Debris Management Ordinance. See Information Handout H for forms and additional information.

14-10.01B Liquidated Damages for Non-Compliance

Non-compliance will result in the following liquidated damages:

1. If you have not met the ordinance requirements, damages will be assessed as 1 percent of the contract amount. This amount will be subtracted from the contract retention at final payment.
2. If, within a 5-year period following a determination by the Agency that you have not met the ordinance requirements, the Agency determines that there has been another violation of ordinance requirements by you or a successor, in a separate contract, that you or a successor must forfeit 1 percent of the contract amount from the contract retention. In addition, you or a successor will be declared by the Board of Supervisors to be a non-responsible bidder and will be ineligible to bid on future County/District contracts for a period of 2 years following the Board's determination.

14-10.02 SOLID WASTE DISPOSAL AND RECYCLING REPORT

Submit a Recycling Summary Report (CND Form 1A and 1B - Information Handout G). The project will not be accepted until it is submitted and approved.

~~Submit a solid waste disposal and recycling report between January 1 and 15 for each year work is performed under the Contract at any time during the previous calendar year. Show the types and amounts of project generated solid waste taken to or diverted from landfills or reused on the project from January 1 to December 31 of the previous calendar year.~~

~~Submit a final solid waste disposal and recycling report within 5 business days after Contract acceptance. Show the types and amounts of project generated solid waste taken to or diverted from landfills or reused on the project from January 1 to Contract acceptance.~~

~~For each failure to submit a completed report, the Agency deducts \$10,000.~~

14-10.03–14-10.05 RESERVED**14-11 HAZARDOUS WASTE AND CONTAMINATION****14-11.01 GENERAL**

Section 14-11 includes specifications relating to hazardous waste and contamination.

If hazardous waste is or will be generated on the job site, the WPC manager must be knowledgeable of proper handling and emergency procedures for hazardous waste as demonstrated by submitting a training certificate which indicates completion of training required under 22 CA Code of Regs § 66265.16.

The WPC manager must:

1. Oversee and enforce hazardous waste management practices
2. Inspect hazardous waste storage areas daily, including temporary containment facilities and satellite collection locations
3. Oversee hazardous waste transportation activities on the job site

14-11.02 DISCOVERY OF UNANTICIPATED ASBESTOS AND HAZARDOUS SUBSTANCES

Upon discovery of unanticipated asbestos or a hazardous substance, immediately stop working in the area of discovery and notify the Engineer if:

1. You reasonably believe the substance is asbestos as defined in Labor Code § 6501.7 or a hazardous substance as defined in Health & Safety Code § 25316 and § 25317.
2. Its presence is not described in the Contract.
3. The substance has not been made harmless.

In accordance with Section 25914.2 of the Health and Safety Code, all such removal of asbestos or Class I hazardous substances including any exploratory work to identify and determine the extent of such asbestos or Class I hazardous substance will be performed under separate contract or force account.

14-11.03 HAZARDOUS WASTE MANAGEMENT

Handle, store, and dispose of hazardous waste under 22 CA Code of Regs Div 4.5.

Use the following storage procedures:

1. Store hazardous waste and potentially hazardous waste separately from nonhazardous waste at the job site.
2. Store hazardous waste using metal containers approved by the US Department of Transportation for the transportation and temporary storage of hazardous waste.
3. Store hazardous waste in sealed, covered containers labeled with the contents and accumulation start date under 22 CA Code of Regs Div 4.5. Labels must comply with the provisions of 22 CA Code of Regs Div 4.5. § 66262.31 and § 66262.32. Immediately replace damaged or illegible labels.
4. Handle the containers such that no hazardous waste is spilled.
5. Store hazardous waste away from storm drains, watercourses, moving vehicles, and equipment.
6. Furnish containers with enough storage volume at convenient satellite locations for collection of hazardous waste. When full or no longer needed, immediately move the containers to secure, temporary containment facilities.
7. Store hazardous waste and potentially hazardous waste in secure, temporary containment enclosures within secondary containment facilities. The secondary containment facilities must be impervious to the stored materials for a minimum contact time of 72 hours. Locate the temporary enclosures away from public access. Acceptable secure enclosures include a locked, chain-link-fenced area or a lockable shipping container located on the job site until disposal as authorized.
8. Design and construct secondary containment facilities with the capacity to contain the greater of:
 - 8.1. Precipitation from a 24-hour-long, 25-year storm and 10 percent of the aggregate volume of all containers
 - 8.2. Entire volume of the largest container within the facility
9. Cover secondary containment facilities during non-working days and if a storm event is predicted. Secondary containment facilities must be adequately ventilated.
10. Keep secondary containment facilities free of accumulated rainwater or spills. After a storm event or a spill or leak, collect the accumulated liquid and place it into storage drums within 24 hours. Handle these liquids as hazardous waste unless testing determines them to be nonhazardous.
11. Do not store incompatible wastes such as chlorine and ammonia in the same secondary containment facility.
12. Provide enough separation between storage containers to allow for cleanup of spills or emergency-response access. Keep storage areas clean, organized, and equipped with supplies appropriate for cleaning up the hazardous wastes being stored.
13. Inspect storage areas at least daily and before and after a storm event.
14. Repair or replace perimeter controls, containment structures, covers, and liners as needed.

Do not:

1. Overfill storage containers
2. Spill hazardous waste or potentially hazardous waste
3. Mix hazardous wastes
4. Allow hazardous waste or potentially hazardous waste to accumulate on the ground

Dispose of hazardous waste within 90 days of the start of generation. Use a hazardous waste manifest and a transporter registered with the DTSC to transport the waste to an appropriately permitted hazardous waste management facility. The transporter must have completed the California Highway Patrol's Basic Inspection of Terminals Program with a satisfactory rating.

14-11.04 DUST CONTROL

Excavation, transportation, and handling of material containing hazardous waste or contamination must result in no visible dust migration. When clearing, grubbing, and performing earthwork operations in areas containing hazardous waste or contamination, provide a water truck or tank on the job site.

14-11.05 STOCKPILING**14-11.05A General**

Do not stockpile material containing hazardous waste or contamination unless authorized in your excavation and transportation plan. Stockpiles containing hazardous waste or contamination must not be placed where affected by surface run-on or run-off. Cover stockpiles with a minimum 12-mils-thick plastic sheeting. Do not place stockpiles in ESAs. Stockpiled material must not enter storm drains, inlets, or waters of the State.

14-11.05B Liner

Reserved

14-11.06 CONTRACTOR-GENERATED HAZARDOUS WASTE**14-11.06A General**

You are the generator of hazardous waste produced from materials you bring to the job site. Manage this waste as hazardous waste under section 14-11.03 if it is produced from the following substances:

1. Petroleum materials
2. Asphalt materials
3. Concrete curing compound
4. Pesticides
5. Acids
6. Paints
7. Stains
8. Solvents
9. Wood preservatives
10. Roofing tar
11. Road flares
12. Lime
13. Glues and adhesives
14. Materials classified as hazardous waste under 22 CA Code of Regs Div 4.5

If concentrations of hazardous waste constituents are unknown, use a laboratory certified by the SWRCB's ELAP to analyze a minimum of 4 discrete, representative samples of the waste. Determine (1) whether it is a hazardous waste and (2) the safe and lawful methods for storage and disposal. Perform sampling and analysis under US EPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846) and 22 CA Code of Regs Div 4.5.

Use your own generator's EPA Identification Number and sign hazardous waste manifests for the hazardous waste you generate.

Within 24 hours of transporting Contractor-generated hazardous waste, submit a copy of the Uniform Hazardous Waste Manifest.

14-11.06B Contractor-Generated Contaminated Soil

Identify contaminated soil resulting from spills or leaks by looking for discoloration or differences in soil properties. Immediately notify the Engineer of spills or leaks. Clean spills and leaks as ordered. Sample soil with evidence of contamination and send the samples for analysis to a laboratory certified by the SWRCB's ELAP.

You are the generator of hazardous waste produced by spills and leaks that you cause. If the soil is determined to be a hazardous waste, handle and dispose of it under section 14-11.03.

Prevent the flow of water, including groundwater, from mixing with contaminated soil by using one or a combination of the following measures:

1. Berms
2. Cofferdams
3. Grout curtains
4. Freeze walls

5. Concrete seal course

If water mixes with contaminated soil and becomes contaminated, sample the water and send the samples for analysis to a laboratory certified by the SWRCB's ELAP. If analysis demonstrates that the water is a hazardous waste, manage and dispose of it under section 14-11.03.

14-11.07 AGENCY-GENERATED HAZARDOUS WASTE**14-11.07A General**

If the Agency is the generator of hazardous waste produced from work activities, manage this hazardous waste under section 14-11.03.

14-11.07B Storage of Agency-Generated Hazardous Waste

Labels on storage containers must comply with 22 CA Code of Regs § 66262.31 and § 66262.32. Mark labels with:

1. Date the hazardous waste was generated
2. *Hazardous Waste*
3. Composition and physical state of the hazardous waste (e.g., asphalt grindings with thermoplastic or paint)
4. *Toxic*
5. Name, address, and telephone number of the Engineer
6. Contract number
7. Name of the contractor or subcontractor

Handle the storage containers such that no hazardous waste is spilled. You are the generator of hazardous waste produced from your spills of Agency-generated hazardous waste.

14-11.07C Transport and Disposal of Agency-Generated Hazardous Waste

Dispose of hazardous waste at a California disposal site operating under a DTSC permit.

The Engineer provides the Agency's EPA Identification Number for hazardous waste disposal.

The Engineer signs the hazardous waste manifests. Notify the Engineer 5 business days before the manifests are to be signed.

Unless there is a spill, ~~The~~ the Agency does not consider you the generator of hazardous waste and you are not obligated for further cleanup, removal, or remedial action for Agency-generated hazardous waste handled and disposed of under:

1. Section 14-11
2. State and federal laws and regulations governing hazardous waste
3. County and municipal ordinances and regulations governing hazardous waste

Within 5 business days of transporting Agency-generated hazardous waste, submit documentation of proper disposal from the receiving landfill.

14-11.08 REGULATED MATERIAL CONTAINING AERIALY DEPOSITED LEAD**14-11.08A General**

Section 14-11.08 applies if the Bid Item List includes an item identifying the need to manage hazardous waste concentrations of ADL. Section 14-11.08 includes specifications for hazardous waste management while excavating, stockpiling, transporting, placing, and disposing of material containing hazardous waste concentrations of ADL.

If the Bid Item List includes "Roadway Excavation Material Disposal (ADL Hazardous Waste)," the material identified as California Hazardous Waste must be disposed of at a California Class I disposal facility.

Excavate, reuse, and dispose of material containing ADL under the rules and regulations of the following agencies:

1. US Department of Transportation
2. US EPA
3. California Environmental Protection Agency
4. CDPH
5. DTSC
6. Cal/OSHA
7. California Department of Resources Recycling and Recovery
8. California Air Resources Board

14-11.08B Definitions

Type Y-1 material: California hazardous waste that may be reused under a variance from the DTSC if the contaminated soil is placed at least 5 feet above the maximum historic elevation of the water table and covered with at least 1 foot of nonhazardous soil. This material contains ADL in average concentrations of 1.5 mg/L or less extractable lead and 1,411 mg/kg or less total lead. The average concentrations are calculated using the 90 percent upper confidence limit. The extractable lead concentrations are determined by a modified waste extraction test using deionized water as the extractant.

Type Y-2 material: California hazardous waste that may be reused under a variance from the DTSC if the contaminated soil is placed at least 5 feet above the maximum historic elevation of the water table and protected from infiltration by pavement that will be maintained by the Agency. This material contains ADL in average concentrations between 1.5 and 150 mg/L extractable lead and between 1,411 mg/kg and 3,397 mg/kg total lead. The average concentrations are calculated using the 90 percent upper confidence limit. The extractable lead concentrations are determined by a modified waste extraction test using deionized water as the extractant.

Type Z-2 material: Agency-generated California hazardous waste that must be disposed of at a California Class I disposal facility. Type Z-2 material is either:

1. Surplus material that contains ADL in average concentrations greater than or equal to 1,000 mg/kg total lead or 5.0 mg/L soluble lead. The average concentrations are calculated using the 95 percent upper confidence limit. The soluble lead is tested using the California Waste Extraction Test.
2. Material that contains ADL in average concentrations greater than 3,397 mg/kg total lead or 150 mg/L extractable lead. The average concentrations are calculated using the 90 percent upper confidence limit. The extractable lead concentrations are determined by a modified waste extraction test using deionized water as the extractant.

Type Z-3 material: Agency-generated federal hazardous waste that must be disposed of at a California Class I disposal site. This material contains ADL in average concentrations greater than 5.0 mg/L soluble lead using a 95 percent upper confidence limit as tested under the toxicity characteristic leaching procedure.

14-11.08C Site Conditions

Concentration data and sample location maps for ADL are included in the *Information Handout*.

14-11.08D Submittals

14-11.08D(1) General

Reserved

14-11.08D(2) Excavation and Transportation Plan

Within 15 days of Contract approval, submit 3 copies of an excavation and transportation plan for material containing hazardous waste concentrations of ADL.

If the plan requires revisions, the Agency provides comments. Submit a revised plan within 7 days of receiving comments. The Engineer may allow construction to proceed while minor revisions or amendments are being completed.

The excavation and transportation plan must comply with:

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1. DTSC regulations
2. Variance regarding the use of material containing ADL
3. Cal/OSHA regulations
4. Requirements for the design and development of a sampling plan, statistical analysis, and reporting of test results under US EPA, SW 846, "Test Methods for Evaluating Solid Waste," Volume II: Field Manual Physical/Chemical, Chapter 9, section 9.1

14-11.08D(3) Burial Location Report

Reserved

14-11.08D(4) Bill of Lading

Submit copies of the bills of lading as an informational submittal upon placement of Type Y-1 or Y-2 material in its final location.

14-11.08E Dust Control

Prevent visible dust migration during excavation, transportation, placement, and handling of material containing hazardous waste concentrations of ADL under section 14-11.04.

14-11.08F Air Monitoring

Reserved

14-11.08G Material Management

Reserved

14-11.08H Surveying Type Y-1 or Y-2 Material Burial Locations

Survey the bottom and top perimeters of each location where you bury Type Y-1 or Type Y-2 material.

The survey must be performed by or under the direction of one of the following:

1. Land surveyor licensed under the Bus & Prof Code Ch 15, starting with § 8700
2. Civil engineer licensed before January 1, 1982 under the Bus & Prof Code Ch 7, starting with § 6700

Survey 10 points to identify each burial location horizontally and vertically within the specified accuracies and to create closed polygons of the bottom and top perimeters of the burial location. If needed to adequately define the polygon, survey additional points. Establish the position of the bottom and top perimeters before placing subsequent layers of material that obstruct the location.

Report each burial location in California state plane coordinates in US survey feet within the appropriate zone of the California Coordinate System of 1983 (CCS83) and in latitude and longitude. Reference horizontal positions to CCS83 (epoch 2007.00 or later National Geodetic Survey [NGS] or California Spatial Reference Center [CSRC] published epoch) to an accuracy of 3 feet horizontally. Identify the survey points to an accuracy of 1 foot vertically. Reference the top and bottom elevations of the burial locations to North American Vertical Datum of 1988 (NAVD88). Report the accuracy of spatial data in US survey feet under Federal Geographic Data Committee (FGDC)-STD-007.1-1998.

The Agency does not pay for:

1. Stockpiling of material containing ADL unless the stockpiling is ordered
2. Sampling and analysis unless it is ordered

14-11.08I Material Transportation

Before traveling on public roads, remove loose and extraneous material from surfaces outside the cargo areas of the transport vehicles. Place tarpaulins or other cover over the cargo as described in the authorized excavation and transportation plan. You are responsible for costs due to spillage of material containing ADL during transport. Transportation routes for Type Y-1 or Type Y-2 material must only include the highway.

14-11.08J Disposal

Transport and dispose of material containing hazardous waste levels of lead under federal and state laws and regulations and County and municipal ordinances and regulations. Laws and regulations that govern this work include:

1. Health & Safety Code § 25100 et seq
2. 22 CA Code of Regs § 66250 et seq
3. 8 CA Code of Regs

The Agency does not pay for additional sampling and analysis required by the receiving landfill.

14-11.09 MINIMAL DISTURBANCE OF REGULATED MATERIAL CONTAINING AERIALLY DEPOSITED LEAD**14-11.09A General**

Section 14-11.09 applies if minimal disturbance of material containing hazardous waste concentrations of ADL is specified in the special provisions under “Special Notices”. Section 14-11.09 includes specifications for handling and managing material containing hazardous waste concentrations of ADL when there is a minimal disturbance.

Compliance with 22 CA Code of Regs is not required where there is minimal disturbance of hazardous waste concentrations of ADL.

Hazardous waste concentrations of ADL are typically found within the top 2 feet of material in unpaved areas of the right-of-way. Management of this material exposes workers to health hazards that must be addressed in your lead compliance plan.

14-11.09B Material Management

Handling of material containing ADL must result in no visible dust migration. Use dust control measures. A means of controlling dust must be available at all times when handling material in work areas containing ADL at hazardous waste concentrations.

Separate material from vegetation. The resulting soil must remain on the job site.

Surplus material from the areas containing hazardous waste concentrations of ADL must remain in the area of disturbance. Do not dispose of surplus material outside the right-of-way.

14-11.10 NATURALLY OCCURRING ASBESTOS

Reserved

14-11.11 AGENCY-GENERATED CONTAMINATED SOIL

Reserved

14-11.12 REMOVAL OF YELLOW TRAFFIC STRIPE AND PAVEMENT MARKING WITH HAZARDOUS WASTE RESIDUE**14-11.12A General**

Section 14-11.12 applies if the removal of existing yellow thermoplastic and yellow painted traffic stripe and pavement marking that will produce hazardous waste residue ~~is as~~ specified ~~in the special provisions by items in the Bid Item List~~. Section 14-11.12 includes specifications for removing, handling, and disposing of yellow thermoplastic and yellow painted traffic stripe and pavement marking. The residue from the removal of this material is a Agency-generated hazardous waste.

Residue from the removal of yellow thermoplastic and yellow painted traffic stripe and pavement marking contains lead chromate. The average lead concentration is at least 5 mg/l soluble lead or 1,000 mg/kg total lead. When applied to the roadway, the yellow thermoplastic and yellow painted traffic stripe and pavement marking contained as much as 2.6 percent lead. Residue produced from the removal of this yellow thermoplastic and yellow painted traffic stripe and pavement marking contains heavy metals in concentrations that exceed thresholds established by the Health & Safety Code and 22 CA Code of Regs. For bidding purposes, assume the residue is not regulated under the Federal Resource Conservation and Recovery Act, 42 USC § 6901 et seq.

The work associated with the disposal of hazardous waste residue identified by test results to be regulated under the Resource Conservation and Recovery Act is change order work.

Removal of existing yellow thermoplastic and yellow painted traffic stripe and pavement marking exposes workers to health hazards that must be addressed in your lead compliance plan. Yellow thermoplastic and yellow paint may produce toxic fumes when heated.

14-11.12B Submittals

14-11.12B(1) General

Reserved

14-11.12B(2) Work Plan

Submit a work plan for the removal, containment, storage, and disposal of yellow thermoplastic and yellow painted traffic stripe and pavement marking. The work plan must include:

1. Objective of the operation
2. List of removal equipment
3. Procedures for the removal and collection of yellow thermoplastic and yellow painted traffic stripe and pavement marking residue, including dust
4. Type of hazardous-waste storage containers
5. Description of storage location and how it will be secured
6. Hazardous waste sampling protocol and QA requirements and procedures
7. Qualifications of sampling personnel
8. Name and address of the analytical test laboratory certified by the SWRCB's ELAP for all analyses to be performed
9. Name of the hazardous waste transporter and the transporter's:
 - 9.1 DTSC registration certificate
 - 9.2 Proof of compliance with the California Highway Patrol Biennial Inspection of Terminals Program
10. Name and address of the disposal site that will accept the hazardous waste residue

If ordered, submit a revised work plan within 5 business days of notification.

14-11.12B(3) Analytical Test Results

Submit analytical test results of the residue and chain of custody documentation before:

1. Requesting the Engineer's signature on the waste profile document for the disposal facility
2. Requesting the generator's EPA Identification Number for disposal from the Engineer
3. Removing the residue from the job site

14-11.12B(4) Disposal Documentation

Submit documentation of proper disposal from the receiving landfill within 5 business days of transporting residue from the job site.

14-11.12C Removal

When grinding or other authorized methods are used to remove yellow thermoplastic and yellow painted traffic stripe and pavement marking that produces a hazardous waste residue:

1. Immediately contain and collect the residue, including dust
2. Use a HEPA filter-equipped vacuum attachment operated concurrently with the removal operations or other equivalent approved method for collection of the residue

14-11.12D Sampling and Testing of Residue

Hazardous waste residue from the removal of yellow thermoplastic and yellow painted traffic stripe and pavement marking must be tested as required by the disposal facility and including:

1. Total lead by US EPA Method 6010B
2. Total chromium by US EPA Method 6010B
3. Soluble lead by the California Waste Extraction Test

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4. Soluble chromium by the California Waste Extraction Test
5. Soluble lead by the Toxicity Characteristic Leaching Procedure
6. Soluble chromium by the Toxicity Characteristic Leaching Procedure

From the first 220 gal of hazardous waste or portion thereof, if less than 220 gal are produced, a minimum of 4 randomly selected samples must be taken and analyzed individually. Samples must not be composited. From each additional 880 gal of hazardous waste or portion thereof, if less than 880 gal are produced, a minimum of 1 additional random sample must be taken and analyzed.

Use chain of custody procedures consistent with chapter 9 of US EPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846) while transporting samples from the job site to the analytical laboratory.

Before performing the analyses, the laboratory must homogenize each sample. The homogenization process must not include grinding of the samples. The aliquot taken from the sample must be:

1. Obtained in an amount large enough for all analyses to be performed
2. Homogenized a 2nd time
3. Used for the total and soluble analyses after the 2nd homogenization

14-11.12E Transport and Disposal of Residue

Request the generator's EPA Identification Number when the Engineer accepts waste characterization test results documenting that the residue is a hazardous waste.

The Engineer signs the manifests as the hazardous waste generator within 5 business days of 1) receiving and accepting the analytical test results and 2) receiving your request for the generator's EPA Identification Number.

If test results demonstrate that the residue is a nonhazardous waste and the Engineer accepts this determination, dispose of the residue at an appropriately permitted CA Class II or CA Class III facility.

The Agency does not adjust payment for the disposal of nonhazardous residue at CA Class II or Class III facility.

14-11.13 DISTURBANCE OF EXISTING PAINT SYSTEMS ON BRIDGES

14-11.13A General

Section 14-11.13 applies if disturbance of the existing paint system on a bridge is specified here. Section 14-11.13 includes specifications relating to the disturbance of an existing paint system on a bridge.

Any work that disturbs the existing paint system produces debris containing heavy metals in amounts that exceed the established thresholds in 8 CA Code of Regs and exposes workers to health hazards which must be addressed in your lead compliance plan. Welding, cutting, or heating the surfaces coated by the existing paint system produces toxic fumes and must be done in compliance with 8 CA Code of Regs § 1537.

Any work that disturbs the existing paint system produces debris containing heavy metals in amounts that exceed the thresholds established in 22 CA Code of Regs. This debris is a Agency-generated hazardous waste.

Grime and detritus already on the bridge before the start of work may also contain lead. Consider the grime and detritus part of the existing paint system. The Agency is the hazardous waste generator if the Engineer accepts waste characterization test results demonstrating that the debris is a hazardous waste.

Contain all debris produced when the existing paint system is disturbed. If containment measures are inadequate to contain and collect debris produced when the existing paint system is disturbed, stop work until:

1. Revised debris containment and collection plan has been authorized
2. Released material has been collected and contained

SECTION 14

ENVIRONMENTAL STEWARDSHIP

In areas without exposed soil, the concentrations of heavy metals in the work area must not increase when the existing paint system is disturbed. Any visible increase in the concentrations of heavy metals must be removed.

Handle, store, transport, and dispose of debris produced when the existing paint system is disturbed under applicable federal, state, and local hazardous waste laws.

14-11.13B Submittals

14-11.13B(1) General

Reserved

14-11.13B(2) Debris Containment and Collection Plan

Submit a debris containment and collection plan. The plan must:

1. Identify materials, equipment, and methods to be used when the existing paint system is disturbed
2. Include shop drawings of:
 - 2.1. Containment systems complying with section 59-2.01C(2)
 - 2.2. Components that provide ventilation, air movement, and visibility for worker safety
3. Include the name and location of the analytical laboratory that will perform the analyses
4. Identify the hazardous waste transporter that will haul the debris and provide documentation of:
 - 4.1. Current DTSC registration
 - 4.2. Compliance with the California Highway Patrol's Biennial Inspection of Terminals Program
5. Include the name and location of the disposal facility that will accept the hazardous waste

Allow 20 days for review. If required, submit a revised debris containment and collection plan.

14-11.13B(3) Air Monitoring Reports

Reserved

14-11.13B(4) Soil Sampling Results for Debris Containment Verification

Reserved

14-11.13B(5) Waste Characterization Test Results

Submit waste characterization test results and chain of custody documentation for the debris before:

1. Requesting the Engineer's signature on the waste profile document for the disposal facility
2. Requesting the generator's EPA Identification Number for disposal
3. Removing the debris from the job site

14-11.13B(6) Disposal Documentation

Submit documentation from the receiving landfill or recycling facility confirming proper disposal within 5 business days of transporting debris from the project.

14-11.13C Safety and Health Protection Measures

Comply with 8 CA Code of Regs including §1532.1.

Supply clean protective work clothing for 5 Agency personnel:

1. Whenever there is possible exposure to heavy metals or silica dust
2. During application of paint undercoats

Replace protective work clothing as needed.

Do not start any work activities with the potential for lead exposure until the Engineer inspects and authorizes protective work clothing and washing facilities.

Protective work clothing remains your property upon completion of the Contract.

14-11.13D Work Area Monitoring

Reserved

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14-11.13E Debris Storage

Debris produced when the existing paint system is disturbed must not be temporarily stored on the ground. Before the end of each work shift, remove accumulated debris from the containment system. Store the debris as hazardous waste.

14-11.13F Debris Waste Characterization

Perform waste characterization testing on the debris as required by Agency and the disposal facility. From the first 220 gal of hazardous waste or portion thereof, if less than 220 gal are produced, a minimum of 4 randomly selected samples must be taken and analyzed individually. Samples must not be composited. From each additional 880 gal of hazardous waste or portion thereof, if less than 880 gal are produced, a minimum of 1 additional random sample must be taken and analyzed.

Use chain of custody procedures consistent with chapter 9 of US EPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846) while transporting samples from the job site to the analytical laboratory. The laboratory must be certified by the SWRCB's ELAP for all analyses to be performed.

Before performing the analyses, the laboratory must homogenize each sample. The homogenization process must not include grinding of the samples. A sample aliquot must be:

1. Obtained in an amount large enough for all analyses to be performed
2. Homogenized a 2nd time
3. Used for the total and soluble analyses after the 2nd homogenization

14-11.13G Debris Transport and Disposal**14-11.13G(1) General**

For bidding purposes, assume the debris is ~~a CA non~~hazardous waste, unless otherwise specified by the bid item. Assume the debris is not regulated under the Federal Resource Conservation and Recovery Act, 42 USC § 6901 et seq. Disposal of hazardous waste debris identified by test results to be regulated under the Resource Conservation and Recovery Act is change order work.

14-11.13G(2) Hazardous Waste Debris

Request the generator's EPA Identification Number when the Engineer accepts waste characterization test results documenting that the debris is a hazardous waste.

Use a hazardous waste manifest and a transporter whose vehicles have current DTSC registration certificates when transporting hazardous waste. The Engineer provides the generator's EPA Identification Number and signs the manifests as the hazardous waste generator within 5 business days of accepting the waste characterization test results and receiving your request for the generator's EPA Identification Number.

14-11.13G(3) Nonhazardous Waste Debris

If waste characterization test results demonstrate that the debris is a nonhazardous waste and the Engineer accepts the results, dispose of the debris at an appropriately permitted CA Class II or CA Class III facility or recycle it. Make all arrangements with the operator of the disposal facility and comply with the facility's requirements.

Be aware that existing asphalt pavement may contain pavement reinforcing fabric.

You may dispose of nonhazardous debris at a facility equipped to recycle the debris if you make all arrangements with the recycling facility's operator and perform any facility-required testing of the debris.

The Agency does not adjust payment for disposal of nonhazardous debris at a recycling facility.

14-11.14 TREATED WOOD WASTE**14-11.14A General**

Section 14-11.14 applies if treated wood waste is shown on the Bid Item List.

SECTION 14

ENVIRONMENTAL STEWARDSHIP

Section 14-11.14 includes specifications for handling, storing, transporting, and disposing of treated wood waste. Manage treated wood waste under 22 CA Code of Regs Div 4.5 Ch 34.

14-11.14B Submittals

Within 5 business days of disposing of treated wood waste, submit as an informational submittal a copy of each completed shipping record and weight receipt.

14-11.14C Training

Provide training to personnel who handle or may come in contact with treated wood waste. Training must include:

1. Requirements of 8 CA Code of Regs
2. Procedures for identifying and segregating treated wood waste
3. Safe handling practices
4. Requirements of 22 CA Code of Regs Div 4.5 Ch 34
5. Proper disposal methods

Maintain training records for 3 years.

14-11.14D Storage of Treated Wood Waste

Store treated wood waste at the jobsite until transport to the CA permitted disposal site.

Until disposal, store treated wood waste using the following methods:

1. Raise the waste on blocks above a foreseeable run-on elevation and protect it from precipitation for no more than 90 days.
2. Place the waste on a containment surface or pad protected from run-on and precipitation for no more than 180 days.
3. Place the waste in water-resistant containers designed for shipping or solid waste collection for no more than 1 year.
4. Place the waste in a storage building as defined in 22 CA Code of Regs Div 4.5 Ch 34 § 67386.6(a)(2)(C).

Prevent unauthorized access to treated wood waste using a secure enclosure such as a locked chain-link-fenced area or a lockable shipping container located within the job site.

Resize and segregate treated wood waste at a location where debris including sawdust and chips can be contained. Collect and manage the debris as treated wood waste.

Identify treated wood waste and accumulation areas using water-resistant labels that comply with 22 CA Code of Regs, Div 4.5 Ch 34 § 67386.5. Labels must include:

1. The words ~~Caltrans District and the district number~~ Alameda County Public Works Agency
2. The words ~~Construction Contract and the contract~~ Specification No. and the specification number
3. ~~District Agency~~ office address
4. Engineer's name, address, and telephone number
5. Contractor's contact name, address, and telephone number
6. Date placed in storage

14-11.14E Transport and Disposal of Treated Wood Waste

Transport treated wood waste directly to the CA permitted disposal site after leaving the jobsite. Do not mix treated wood waste from the job site with waste from any other generator.

Dispose of treated wood waste within:

1. 90 days of generation if stored on blocks
2. 180 days of generation if stored on a containment surface or pad
3. 1 year of generation if stored in a water-resistant container or within 90 days after the container is full, whichever is shorter

4. 1 year of generation if stored in a storage building as defined in 22 CA Code of Regs, Div 4.5, Ch 34, § 67386.6(a)(2)(C)

Before transporting treated wood waste, obtain agreement from the receiving facility that it will accept the waste. Protect shipments of the waste from loss and exposure to precipitation. For projects generating 10,000 lb or more of treated wood waste, request a generator's EPA Identification Number from the Engineer at least 5 business days before the 1st shipment. Each shipment must be accompanied by a shipping record such as a bill of lading or invoice that includes:

1. The words ~~Caltrans District and the district number~~ Alameda County Public Works Agency
2. The words ~~Construction Contract and the contract number~~ Specification No. and the specification number
3. ~~District Agency~~ office address
4. Engineer's name, address, and telephone number
5. Contractor's name, contact person, and telephone number
6. Receiving facility's name and address
7. Description of the waste (e.g., treated wood waste with preservative type if known or unknown/mixture)
8. Project location
9. Estimated weight or volume of the shipment
10. Date of transport
11. Date of receipt by the treated wood waste facility
12. Weight of shipment measured by the receiving facility
13. Generator's US EPA Identification Number for projects generating 10,000 lb or more of treated wood waste

The shipping record must be 8-1/2 by 11 inches and a 4-part carbon or carbonless form to provide copies for the Engineer, transporter, and treated wood waste facility.

Dispose of treated wood waste at an approved California disposal site operating under a RWQCB permit that includes acceptance of treated wood waste.

14-11.15 DISPOSAL OF ELECTRICAL EQUIPMENT REQUIRING SPECIAL HANDLING

Reserved

14-11.16 ASBESTOS-CONTAINING CONSTRUCTION MATERIALS IN BRIDGES

Reserved

14-11.17-14-11.20 RESERVED

14-12 OTHER AGENCY REGULATORY REQUIREMENTS

14-12.01 GENERAL

Section 14-12 includes specifications relating to other agencies' environmental regulations and PLACs.

14-12.02 STATE PARKS

Section 14-12.02 includes specifications for working in areas under the jurisdiction of State Parks.

Comply with the State Parks' regulations and PLACs.

Protect natural and cultural features within the park.

14-12.03 STATE RECLAMATION BOARD

Section 14-12.03 includes specifications for working in areas under the jurisdiction of the State Reclamation Board.

Comply with the State Reclamation Board's regulations and PLACs.

Submit proposed changes to the PLAC requirements for transmittal to the State Reclamation Board. Do not implement these changes until the Engineer receives written approval from the State Reclamation Board.

15 EXISTING FACILITIES

15-1.01 GENERAL

Section 15 includes general specifications for performing work on existing facilities. A facility is any amenity existing for a particular purpose and includes private property improvements, such as mailboxes, fences, walls, parking bumpers, irrigation systems, planting beds, areas of turf, and other landscaping elements.

Performing work on existing facilities includes abandoning, adjusting, modifying, obliterating, reconstructing, relaying, relocating, remodeling, removing, repairing, resetting, or salvaging a facility.

Telephone Underground Service Alert (USA) at (800) 642-2444 a minimum of 48 hours prior to start of work so that underground facilities can be located and marked by the various utilities.

Do not perform work on an existing facility until the facility is no longer needed.

Reconstructed facilities must comply with the design of and be equal to the best parts of the existing facilities.

Reconstruction work must comply with the specifications for new work of similar character.

15-1.02 MATERIALS

Materials for adjusting facilities to grade must be similar in character to the existing materials.

15-1.03 CONSTRUCTION

15-1.03A General

Backfill trenches, holes, depressions, and pits caused by performing work on an existing facility. In an unsurfaced area, backfill with embankment material under section 19. In a surfaced area, backfill with material equal to or better than the surrounding material. Grade backfilled areas to drain and blend in with the surrounding area.

Clean earth and other foreign material, including concrete, from material to be salvaged or incorporated into the work.

Dispose of removed facilities not to be salvaged or incorporated into the work.

If you damage a facility or a portion of a facility to remain in place, repair or replace it. The repair or replacement must be equal or better in quality than the original portion.

Repair or replace materials to be salvaged or incorporated into the work that are lost or damaged during work activities. The repair or replacement must be equal or better in quality than the original portion. Instead of this repair or replacement, the Agency may deduct the repair or replacement cost.

Replace material from existing facilities described to be reused in the work if the Engineer determines the material is unsuitable. Furnishing the replacement material is change order work.

If you damage a part of a loop conductor specified to remain in place, including the part leading to the adjacent pull box, replace the entire loop detector and any adjacent loops damaged during the replacement.

Break the floors of structures within the roadway that are not required to be removed such that water will not be entrapped.

Where abrasive blasting is performed within 10 feet of a lane open to traffic, remove residue with a vacuum attachment operating concurrently with the blast cleaning equipment.

15-1.03B Removing Concrete

Where concrete is described to be removed, remove the concrete to a depth of at least 3 feet below finished grade.

Concrete removal includes removal of any steel embedded in the concrete.

SECTION 15

EXISTING FACILITIES

Before removing a portion of a monolithic concrete element, make a 1-inch-deep saw cut to a true line along the limits of removal on faces of the element that will be visible in the completed work.

Protect existing reinforcement to be incorporated into the new work from damage.

Where new concrete is to join existing concrete, remove enough concrete to allow splicing of new reinforcement.

Thoroughly remove all material adhering to the existing reinforcement before embedding it in new concrete.

~~Instead of disposing of removed concrete, you may:~~

~~1. Incorporate it in adjacent embankments if it is:~~

~~1.1. Broken into parts at most 10 inches in greatest dimension~~

~~1.2. Buried at least 3 feet below the finished grade and slope lines~~

~~1.3. Buried at least 10 feet from trees or highway facilities~~

~~1.4. Not buried where piling is to be constructed~~

~~2. Place it at authorized locations such that it will not present an unsightly appearance from the highway~~

15-1.03C Salvaging Facilities

Tag the bundles, packages, and individually salvaged material. Show the following information on the tags:

1. Name or description of the material
2. Type or model number
3. Dimensions
4. Quantity if more than 1

Unless otherwise directed by the Engineer, deliver salvaged material to the ACPWA Corp Yard at 951 Turner Court, Hayward, 94545. Delivery includes unloading and placing material as directed.

~~Haul salvaged material directly to the location specified in the special provisions and stockpile it.~~

If authorized, you may temporarily stockpile salvaged material at the job site. Replace any salvaged material that is lost before it is stockpiled at the location specified in the special provisions.

15-1.03D–15-1.03K Reserved

15-1.04 PAYMENT

If there is no bid item for work on an existing facility, then full compensation is included in the payment for the bid items involved, as described under section 9-1.03. For example, if an existing mailbox must be relocated to construct a sidewalk and there is no bid item to relocate mailbox, the work of relocating the mailbox is paid for under the sidewalk item. The exception is when the work required on an existing facility could not be foreseen, in which case it is change order work.

16 TEMPORARY FACILITIES

16-1 GENERAL

16-1.01 GENERAL

Section 16-1 includes general specifications for constructing temporary facilities.

Constructing temporary facilities includes placing temporary devices.

16-1.02 MATERIALS

You may use used materials for temporary facilities if the used materials comply with the specifications for new materials.

16-1.03 CONSTRUCTION

Maintain temporary facilities until they are no longer needed.

Excavate and backfill as necessary to remove temporary facilities. Backfill with materials of equal or better quality and to a comparable density of the surrounding materials and grade the surface to match the existing grade and cross slope.

Dispose of temporary facilities when they are no longer needed.

16-1.04 PAYMENT

Not Used

16-2 MISCELLANEOUS TEMPORARY FACILITIES

16-2.01 GENERAL

16-2.01A General

Section 16-2 includes specifications for constructing miscellaneous temporary facilities.

Miscellaneous temporary facilities include temporary facilities that apply to multiple sections or are not closely associated with other sections.

16-2.01B Materials

Not Used

16-2.01C Construction

Not Used

16-2.01D Payment

Not Used

16-2.02 TEMPORARY PEDESTRIAN FACILITIES

16-2.02A General

16-2.02A(1) Summary

Section 16-2.02 includes specifications for constructing temporary pedestrian facilities.

Temporary pedestrian facilities must comply with the *California MUTCD*, Part 6, Chapter 6D, "Pedestrian and Worker Safety."

Lighting must comply with the specifications for falsework lighting in section 48.

16-2.02A(2) Definitions

Reserved

16-2.02A(3) Submittals

Submit shop drawings and supporting calculations for temporary pedestrian facilities with a protective overhead covering. Shop drawings and calculations must be signed by an engineer who is registered as a civil engineer in the State.

16-2.02A(4) Quality Assurance

Reserved

16-2.02B Materials**16-2.02B(1) General**

The walkway must be surfaced with asphalt concrete, commercial-quality concrete, or wood. The surface must be skid resistant and free of irregularities.

Hand railings must be S4S lumber and painted white.

The protective overhead covering of a temporary pedestrian facility must be plywood at least 3/4 inch thick or wood planking with a nominal minimum thickness of 2 inches.

16-2.02B(2) Design Requirements

Design a temporary pedestrian facility with a protective overhead covering to support all imposed loads.

The design load and maximum allowable stresses for a temporary pedestrian facility with protective overhead covering must comply with section 48-2.02B. The minimum design live load for a temporary pedestrian facility with a protective overhead covering must be 150 psf for the entire structure.

16-2.02C Construction

Construct handrails on each side of a temporary pedestrian facility as necessary to protect pedestrian traffic from hazards due to work activities or adjacent vehicular traffic.

The minimum width between the inside face of the handrails must be 60 inches. The clear height of the facility measured from the floor surface to the canopy overhead must be at least 8 feet. Provide adequate lighting at all times.

Extend overhead protection for pedestrians at least 4 feet beyond the edge of the bridge deck. Illuminate all pedestrian openings through falsework.

Maintain a temporary pedestrian facility in good condition and keep it clear of obstructions.

16-2.02D Payment

Not Used

16-2.03 TEMPORARY HIGH-VISIBILITY FENCES**16-2.03A General****16-2.03A(1) Summary**

Section 16-2.03 includes specifications for constructing temporary high-visibility fences.

Constructing a temporary high-visibility fence includes the installation of any signs ~~shown specified in the special provisions.~~

16-2.03A(2) Definitions

Reserved

16-2.03A(3) Submittals

Submit a certificate of compliance for the high-visibility fabric.

16-2.03A(4) Quality Assurance

Reserved

16-2.03B Materials

High-visibility fabric must be manufactured from polypropylene, polyethylene, or a combination of both.

Identify, store, and handle the fabric under ASTM D4873.

The fabric must be orange, contain UV inhibitors, and have a width of at least 48 inches and openings from a minimum 1 by 1 inch to a maximum 2 by 4 inches.

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SECTION 16

TEMPORARY FACILITIES

The minimum roll weight for a 4-by-100-foot roll of fabric must be 12 lb.

Posts must be either wood or steel.

Each wood post must:

1. Be untreated fir, redwood, cedar, or pine and cut from sound timber
2. Be straight and free from loose or unsound knots or other defects that would make it unfit for use
3. Have a cross section of at least 2 by 2 inches
4. Have a length of at least 6 feet
5. Have a pointed bottom end

Each steel post must have:

1. *U*, *T*, *L*, or other cross-sectional shape that resists failure from lateral loads.
2. Weight of at least 3/4 lb/ft.
3. Length of at least 6 feet.
4. Pointed bottom end.
5. Safety cap attached to the exposed end. The cap must be orange or red plastic and fit snugly to the post.

16-2.03C Construction

Install posts at a maximum 8-foot center-to-center spacing.

Embed each post in the ground at least 16 inches.

Attach fabric to wood posts with nails or staples.

Attach fabric to steel posts with tie wires or locking plastic fasteners at a maximum spacing of 8 inches.

Maintain posts in a vertical position.

Reattach any detached fabric.

Replace any damaged fabric.

16-2.03D Payment

Not Used

16-2.04 TEMPORARY CONSTRUCTION MATS

16-2.04A General

16-2.04A(1) General

16-2.04A(1)(a) Summary

Section 16-2.04A includes general specifications for constructing temporary construction mats.

16-2.04A(1)(b) Definitions

Reserved

16-2.04A(1)(c) Submittals

Submit a schedule for the placement and removal of the mats. Include the location, mat type, and placement and removal dates for each location. Describe the method of installing and removing the mats.

16-2.04A(1)(d) Quality Assurance

Reserved

16-2.04A(2) Materials

A temporary construction mat must be manufactured (1) for use as a temporary roadway, (2) to protect the ground without ground preparation, and (3) to prevent permanent damage and minimize temporary damage to a wetland.

SECTION 16

TEMPORARY FACILITIES

16-2.04A(3) Construction

The mats must provide a continuous cover over the wetlands. Seal openings around any columns or other obstacles. Obtain authorization for the seals.

Mats must be free from soil, seeds, or other organic or hazardous material before entering the work area.

Conduct temporary installation activities on the mats or outside of wetlands.

Do not install mats whenever the National Weather Service predicts at least a 50 percent probability of precipitation within 72 hours.

Clean debris from the mats daily. Inspect the mats and immediately replace or repair damaged or broken mats.

When no longer needed, move mats to a washout location and clean them before removing them from the job site. The washout location must be outside of wetlands and ESAs and inside the cleared work area where wash water and other material will not enter any wetlands, streams, or ESAs.

16-2.04A(4) Payment

Not Used

16-2.04B HDPE Mats

16-2.04B(1) General

Section 16-2.04B includes specifications for constructing HDPE temporary construction mats.

16-2.04B(2) Materials

An HDPE mat must:

1. Be made of HDPE
2. Be at least 4 feet wide by 8 feet long and 1/2 inch thick
3. Have a load-bearing capacity of at least 60 tons

16-2.04B(3) Construction

Not Used

16-2.04B(4) Payment

Not Used

16-2.04C–16-2.04G Reserved

16-2.05 JOB SITE WATER CONTROL

16-2.05A General

16-2.05A(1) General

Section 16-2.05 includes specifications for controlling water to provide a dry working area at the job site.

16-2.05A(2) Materials

Not Used

16-2.05A(3) Construction

Not Used

16-2.05A(4) Payment

Not Used

16-2.05B Water-Filled Cofferdam

Reserved

16-2.05C–16-2.05G Reserved

16-3–16-10 RESERVED

DIVISION III EARTHWORK AND LANDSCAPE

Replace section 17 with:

17 GENERAL

17-1 GENERAL

17-1.01 GENERAL

Section 17 includes general specifications for grading.

17-1.02 MATERIALS

Not Used

17-1.03 CONSTRUCTION

Not Used

17-1.04 PAYMENT

Not Used

17-2 CLEARING AND GRUBBING

17-2.01 GENERAL

Section 17-2 includes specifications for clearing and grubbing.

Clearing and grubbing consists of removing objectionable material, including unpermitted, privately constructed encroachments, such as fences, walls, edging, pavers, vegetation and other landscaping materials from the entire project area, unless otherwise shown or directed following construction areas:

- ~~1. Highways~~
- ~~2. Bridges and other structures~~
- ~~3. Roads, road approaches, streets, and ramps~~
- ~~4. Material sites~~
- ~~5. Ditches and channels~~
- ~~6. Areas enclosed by interchange loops and ramps~~
- ~~7. Other described areas~~

The Agency may salvage materials from improvements before the bid opening date.

17-2.02 MATERIALS

Not Used

17-2.03 CONSTRUCTION

17-2.03A General

Complete the work specified in section 20-10.02C(2), "Check and Test Existing Irrigation Facilities," before clearing and grubbing.

Clear and grub before performing earthwork in an area.

Do not injure standing trees, plants, and improvements shown to be protected.

Clear and grub the entire length of the job site within the project limits, unless otherwise shown or directed. to the following widths:

- ~~1. 5 feet outside of excavation and embankment slope lines where slopes are not rounded~~
- ~~2. Outside limits of slopes where slopes are rounded~~
- ~~3. 5 feet outside of structures~~
- ~~4. 2 feet outside of slope lines for ditches and channels with a bottom width of less than 12 feet~~
- ~~5. 5 feet outside of slope lines for ditches and channels with a bottom width of 12 feet or more~~

If the construction area includes an orchard, vineyard, or other cultivated area, remove all orchard trees, vines, and other vegetation in the entire area shown or as directed within highway to right-of-way lines.

17-2.03B Clearing

17-2.03B(1) General

Clear all construction areas above original ground of (1) all vegetation such as trees, logs, upturned stumps, roots of downed trees, brush, grass, and weeds and (2) other objectionable material including concrete, masonry, and debris.

17-2.03B(2) Tree Trimming

17-2.03B(2)(a) General

Comply with the requirements of the Alameda County Tree Ordinance, except that you are exempt from having to obtain a County encroachment permit for Project related work.

Protect public safety under section 7-1.04. Temporarily control traffic under section 12. Setup “no parking” zones as needed and as previously noticed.

17-2.03B(2)(b) Quality Assurance

Employ trained tree trimmer personnel. All trimming work must be supervised and directed by an arborist certified by the International Society of Arboriculture (ISA).

All trimming work must comply with CAL-OSHA standards and adhere to the current editions of:

1. Best Management Practices, International Society of Arboriculture
2. American National Standards Institute, A300 Part 1 – Pruning

Identify all trees and vegetation to be trimmed with temporary markings on the adjacent roadway for review by the Engineer prior to beginning any cutting operations.

17-2.03B(2)(c) Quality Control and Liquidated Damages

You are responsible for any damage to trees, vegetation, or private property caused by your operations or your improper pruning or trimming. You will be assessed for the value of the damage based upon the current edition of the Council of Tree and Landscape Appraisers’ Guide for Plant Appraisal Standard method of valuation.

17-2.03B(2)(d) Nesting Bird Survey

When tree trimming work is scheduled between February 15 and September 1, the Agency will first conduct a nesting bird survey. Notify the Engineer at least 7 days before planned tree trimming work so that the survey can be conducted. Do not begin tree trimming work until receiving written approval.

17-2.03B(2)(e) Notification

Provide written notification, approved by the Engineer, a minimum of 72 hours in advance of any cutting operations to property owners, residents, businesses, and public entities potentially affected. Include planned parking restrictions as part of the notification.

17-2.03B(2)(f) Submittals

Submit a copy of the supervising arborist’s ISA certification prior to performing trimming work.

Submit a pruning plan at least 14 days before performing work. The plan must include the contact information of the person who will supervise the work and a list of all trees or vegetation to be trimmed with corresponding addresses or locations.

Submit a copy of required resident notifications for approval at least 2 days prior to the scheduled distribution.

Submit an affidavit documenting the time and date that required resident notifications were distributed.

Submit an affidavit documenting the time and date of any parking restriction postings.

17-2.03B(2)(g) Execution

Cut tree branches that extend over the roadway and hang within ~~20~~ **14.5** feet of finished grade. Cut other branches to give each tree a balanced appearance. Balance the crown by thinning, reducing end weights, shortening long heavy limbs, removing deadwood, weak limbs, and sucker growth. Cut off branches close to the trunk under section 20-3.01C(2).

17-2.03C Grubbing

Grub all construction areas to a depth necessary to remove all trees, existing stumps, roots, buried logs, and other objectionable material, except embankment areas where the grading plane is 2 feet or more above original ground.

In embankment areas where the grading plane is 2 feet or more above original ground, cut off trees, stumps, and roots not more than 1 foot above original ground, except remove trees, stumps, and roots completely where work includes any of the following:

1. Structure construction
2. Pile construction
3. Subdrainage trench excavation
4. Removal of unsuitable material
5. Cutting into slopes of original hillsides, old or new fill

17-2.03D Disposal of Materials

Dispose of objectionable materials resulting from clearing and grubbing activities, unless ~~(4)~~ the Contract includes a bid item for duff as specified in section 21-1.02C. Bury the chips or distribute them uniformly by mixing with underlying soil to prevent combustion.

Do not leave objectionable material in or under embankments, including dikes.

Accumulation of flammable material is not allowed.

Under 14-9.02, "Air Pollution Control," burning of material is not allowed.

17-2.04 PAYMENT

Not Used

17-3–17-10 RESERVED

Replace section 18 with:

18 DUST PALLIATIVES

18-1.01 GENERAL

18-1.01A Summary

Section 18 includes specifications for applying dust palliatives.

A dust palliative must be water ~~any of the following:~~

1. Water
2. Dust suppressant
3. Dust control binder

18-1.01B Definitions

Not Used

18-1.01C Submittals

Not Used

18-1.01D Quality Assurance

Not Used

18-1.02 MATERIALS

Not Used

18-1.03 CONSTRUCTION

18-1.03A General

Monitor dust conditions and apply a dust palliative for dust control as described and as ordered. Reapply the dust palliative at any time to control dust.

~~Apply a dust suppressant to:~~

- ~~1. Temporary haul roads~~
- ~~2. Construction staging, material storage, and layout areas~~
- ~~3. Compacted soil or AB roads or driveways~~
- ~~4. Paved surfaces~~

~~Apply a dust control binder to:~~

- ~~1. Rough graded soils~~
- ~~2. Completed slopes~~
- ~~3. Soil stockpiles unless another practice is already used~~

~~Do not use a dust suppressant or dust control binder within 100 feet of a wetland or body of water.~~

18-1.03B Equipment

Not Used

18-1.03C Mixing and Application Rates

Not Used

18-1.04 PAYMENT

Not Used

Replace section 19 with:

19 EARTHWORK

19-1 GENERAL

19-1.01 GENERAL

19-1.01A Summary

Section 19-1 includes general specifications for performing earthwork activities.

Performing earthwork activities includes removal of unsuitable material or a buried man-made object if the removal is described.

If paleontological resources mitigation is specified in the special provisions under section 14-7.04, performing earthwork activities includes:

1. Paleontological resources training for your staff and subcontractors
2. Submittals of your schedule of subsurface-disturbing activities and updated schedules
3. Coordination and work with the Agency's mitigation team

Complete work specified in section 20-10.02C(2) before starting earthwork activities.

19-1.01B Definitions

Reserved

19-1.01C Submittals

Reserved

19-1.01D Quality Assurance

Reserved

19-1.02 MATERIALS

Not Used

19-1.03 CONSTRUCTION

19-1.03A General

Unless the material resulting from the excavation is hazardous, construct embankments and dikes or backfill structures with it. If the quantity of excavated material is not sufficient to construct embankments, obtain the material under section 19-7.

19-1.03B Unsuitable Material

Excavate and dispose of unsuitable material encountered below the natural ground surface in embankment areas or below the grading plane in excavation areas as ordered.

Notify the Engineer before removing the unsuitable material if:

1. Removal is not otherwise described
2. You request payment for removal as change order work

Backfill the space resulting from excavating unsuitable material with material suitable for the planned use. Place and compact suitable material under section 19-5.

19-1.03C Grade Tolerance

Immediately before placing subsequent layers of material, prepare the grading plane such that the grading plane:

1. Does not vary more than 0.05 foot above or below the grade established by the Engineer where HMA is to be placed.
2. Does not extend above the grade established by the Engineer where concrete base or pavement is to be placed.

3. Beneath structural approach slabs or the thickened portion of sleeper slabs do not extend above the grade established by the Engineer.
4. At any point is within 0.05 foot above the grade established by the Engineer if the material to be placed on the grading plane is paid by the cubic yard.
5. At any point is within 0.10 foot above the grade established by the Engineer if subbase or base material to be placed on the grading plane is paid by the ton.

19-1.03D Buried Man-Made Objects

Remove and dispose of a buried man-made object encountered in an excavation as part of the excavation work.

Notify the Engineer before removing the buried man-made object if:

1. Removal of the object is not otherwise described
2. Object could not have been determined by visual inspection
3. You request payment for removal of the object as change order work

19-1.04 PAYMENT

Not Used

19-2 ROADWAY EXCAVATION**19-2.01 GENERAL****19-2.01A Summary**

Section 19-2 includes specifications for performing roadway excavation.

Roadway excavation consists of all excavation involved in the grading and construction of the roadway except structure excavation and any excavation paid for as a separate bid item.

Roadway excavation includes:

1. Excavating and stockpiling the selected material
2. Removing the stockpiled material and placing it in its final position
3. Removing surcharge material
4. Performing the removal of a slide or slipout which is paid for as the type of roadway excavation involved

19-2.01B Definitions

selected material: Specific material excavated from a described location on the job site. Selected material includes topsoil.

19-2.01C Submittals

Reserved

19-2.01D Quality Assurance

Reserved

19-2.02 MATERIALS

Not Used

19-2.03 CONSTRUCTION**19-2.03A General**

Excavate to the described or authorized grade. If you overexcavate, backfill with an authorized material and compact it.

Remove pavement within the limits of roadway excavation. Pavement removal must comply with section 39 and 41.

Compaction must comply with section 19-5.

Construct embankments under section 19-6.

19-2.03B Surplus Material

If a quantity of surplus material is shown, the quantity is approximate.

Ensure enough material is available to complete the embankments before placing the material at other locations on the job site or disposing of it.

Obtain authorization before disposing of surplus material or using it for any of the following:

1. Widening embankments uniformly
2. Flattening slopes
3. Placing along the roadway or at other locations

If you cannot use surplus material within the highway, dispose of it.

If you dispose of any surplus material prematurely and later find a material shortage, replace the surplus material with an authorized material.

If an ordered change increases the quantity of excavation or decreases the quantity of embankment such that surplus material must be disposed of, disposing of this material is change order work.

19-2.03C Deficiency Material

If the quantity of acceptable material from excavation is not enough to construct the embankments, the quantity of material needed to complete the embankments must consist of local or imported borrow.

Obtain local or imported borrow under section 19-7.

If a bid item for imported borrow is not shown on the Bid Item List, obtaining imported borrow is change order work.

19-2.03D Selected Material**19-2.03D(1) General**

If selected material is not used for a specified layer, place the selected material in the roadway prism as embankment or structure backfill.

If selected material is used as a specified layer, spread and compact it under section 25.

If practicable and unless processing of material is required, haul selected material directly from the excavation to its final position in the roadway prism and compact it in place.

Selected material must remain in place until it can be placed in its final position unless stockpiling of selected material is ordered.

If stockpiling of selected material is ordered, excavate and stockpile the selected material until the stockpiled material is to be placed in its final position in the roadway prism. This work is change order work.

19-2.03D(2) Topsoil

Reserved

19-2.03E Blasting

The Agency does not allow ~~excessive~~ blasting.

~~Remove material outside the planned cross section that is shattered or loosened due to blasting.~~

~~Suspend blasting activities if any of the following conditions occurs:~~

- ~~1. Any sign of overshooting~~
- ~~2. Endangerment to the public~~
- ~~3. Destruction of property or natural features~~

19-2.03F Slides and Slipouts

Excavate and remove material:

1. Outside the planned roadway or ditch slope that is unstable and constitutes a potential slide
2. From a slide that has come into the roadway or ditch
3. Slipped out of new or existing embankments

Excavate to the designated lines or slopes either by benching or as ordered.

Use removed material to construct embankments unless otherwise ordered.

Before removal activities if removal of a slide or a slipout is not described, you may request the removal to be change order work.

If you complete a slope and are ordered to remove unstable or stable material and reslope the area, the removal and resloping is change order work.

Repair any damage to the completed work resulting from a slide or slipout as ordered.

Repairing damage to the completed work due to a slide or slipout is paid for as the type of work involved unless otherwise ordered as change order work.

If a slide or slipout is caused by your activities or negligence, remove the slide or slipout material and restore the slope.

19-2.03G Slopes

Construct slopes to the lines and grades established by the Engineer. Slope tolerances are measured perpendicular to the planned slope.

Any point on the completed excavation slope must be within 0.5 foot of the planned slope, unless the excavation is in rock, in which case, any point on the completed slope must be within 2 feet of the planned slope.

Slopes or portions of slopes must not encroach on the roadbed.

Round the tops of excavation slopes and ends of excavations.

Any point on the completed embankment slope must be within 0.5 foot of the planned slope for slopes within 4 feet of the shoulder grade. Slopes below 4 feet must be within 1 foot of the planned slope.

If an embankment is constructed of large rock and the size of rocks make it impracticable to construct slopes within 1 foot, the Engineer may authorize you to construct slopes more than 4 feet below shoulder grade to within 2 feet of the planned slope.

For median and side slopes with a 6:1 (horizontal:vertical) or flatter slope:

1. Completed slopes must be within 0.2 foot from the grade established by the Engineer
2. Flowlines must be graded to drain and must be within 0.1 foot from the grade established by the Engineer

If the slope is to be cultivated or straw is to be incorporated into the surface, remove loose rocks larger than 2-1/2 inches in maximum dimension, roots, and other debris on the surface of the slope before cultivation or incorporation of straw.

Maintain completed slopes. Repair any slope damage caused by erosion.

19-2.03H Ditch Excavation

Excavate ditches including channels for changing the course of streams.

Avoid excavating below the grade for the bottom of the ditch or water channel. If you excavate below grade, backfill with suitable material and compact it.

19-2.04 PAYMENT

The payment quantity for roadway excavation is the volume of roadway excavation material, including volume of material involved in:

1. Embankment construction unless a separate bid item for constructing embankments is shown on the Bid Item List
2. Ditch or channel excavation if the bottom width of the ditch or channel is 12 feet or more
3. Local borrow excavation

The volume of material for roadway excavation is determined from the average end areas and the distances between them.

If changed conditions or nature of a particular operation make determining the quantities of roadway excavation based on average end areas impractical, the payment quantity is the volume determined using a method best suited to obtain an accurate quantity.

If the quantities of roadway excavation are determined from average end areas and centerline distances, a correction for curvature is not applied to quantities within the roadway prism. In determining the quantity of material outside the original roadway prism, where the roadway centerline is used as a base, a correction is made for curvature if the centerline radius is 1,000 feet or less.

The volume of material removed from a stockpile is determined from measurements of the stockpile before removal.

If the bottom of a ditch or channel is less than 12 feet wide, the payment quantity for ditch excavation is the volume determined from average areas and the distances between them.

19-3 STRUCTURE EXCAVATION AND BACKFILL**19-3.01 GENERAL****19-3.01A Summary**

Section 19-3 includes specifications for performing structure excavation and backfill.

Structure excavation includes:

1. Excavating foundations for structures, including trenches for culverts, pipes, rods, deadmen, cutoff walls, and other facilities
2. Placing structure backfill where compaction of the structure backfill is not required.
3. Control and removal of water
4. Installation and removal of facilities required to complete the work unless specified or allowed to remain in place

Structure excavation (Type A) includes excavation for footings where seal courses are shown.

Structure excavation (bridge) includes structure excavation not shown on the Bid Item List or plans as any other type of structure excavation.

Structure backfill (bridge) includes structure backfill not shown on the Bid Item List or plans as any other type of structure backfill.

Structure excavation (bridge) or structure backfill (bridge) includes structure excavation or structure backfill for bridges not described by type.

19-3.01B Definitions

Reserved

19-3.01C Submittals**19-3.01C(1) General**

Reserved

SECTION 19

EARTHWORK

19-3.01C(2) Cofferdams

Not Used

19-3.01C(3) Soldier Pile Walls

Not Used

19-3.01C(4) Ground Anchor and Soil Nail Walls

Not Used

19-3.01C(5) Test Results

Not Used

19-3.01C(6) Controlled Low-Strength Material

If you propose using controlled low-strength material, submit a mix design. Include test data before excavating the trench where controlled low-strength material is to be used.

19-3.01D Quality Assurance

19-3.01D(1) General

Reserved

19-3.01D(2) Stability Test for Ground Anchor and Soil Nail Walls

Not Used

19-3.02 MATERIALS

19-3.02A General

Reserved

19-3.02B Cofferdam

Not Used

19-3.02C Structure Backfill

Structure backfill must be free of organic or other unsatisfactory material.

The impervious backfill material must be an authorized earthy material. The sand equivalent requirement does not apply.

Structure backfill compacted to a relative compaction of at least 95 percent and material placed behind retaining walls must have a sand equivalent value of at least 20 and comply with the gradation requirements shown in the following table:

Sieve size	Percentage passing
3"	100
No. 4	35–100
No. 30	20–100

Except for material placed behind retaining walls, structure backfill compacted to a relative compaction of at least 90 percent must comply with the gradation requirements shown in the following table:

Sieve size	Percentage passing
3"	100

Structure backfill for crib walls must comply with the requirements shown in the following tables:

Wall height (feet)	Type of backfill material	Thickness of each layer of material before compaction (feet)
<10	C, D, or E	1
10–25	D or E	2
>25	E	4

Backfill material type	Gradation		Sand equivalent (min)	Relative compaction (min, %)
	Sieve size	Percentage passing		
C	3"	100	--	90
D	3"	100	30	90
	No. 4	35–100		
E	3"	100	--	90
	No. 4	25–70		
	No. 50	5–20		
	No. 200	0–5		

Material from structure excavation not suitable for use as structure backfill may be used to replace imported borrow or other excavated material.

19-3.02D Pervious Backfill Material

Pervious backfill material must consist of one or any combination of the following materials:

1. Gravel
2. Crushed gravel
3. Crushed rock
4. Natural sand
5. Manufactured sand

Pervious backfill material must comply with the gradation requirements shown in the following table:

Sieve size	Percentage passing
2"	100
No. 50	0–100
No. 100	0–8
No. 200	0–4

The gradation for sacked pervious backfill material behind wall drain outlets must comply with the gradation specified for 1-1/2-by-3/4 inch primary aggregate in section 90-1.02C(4)(b).

A weep hole and geocomposite drain alternative must comply with section 68-7.

19-3.02E Slurry Cement Backfill

Slurry cement backfill must be a fluid workable mixture of aggregate, cement, and water.

The aggregate must be one of the following:

1. Commercial-quality concrete sand
2. Excavated or imported material in any combination, free of organic material and other deleterious substances and complying with the gradation requirements shown in the following table:

Sieve size	Percentage passing
1-1/2"	100
1"	80–100
3/4"	60–100
3/8"	50–100
No. 4	40–80
No. 100	10–40

The cement must comply with section 90-1.02B(2) except testing is not required.

The water must be free from oils, salts, and other impurities that adversely affect the backfill.

Proportion slurry cement backfill by weight or volume. The backfill must contain at least 188 pounds of cement per cubic yard and enough water to produce a fluid workable mix that flows and can be pumped without segregation during placement.

Mix materials thoroughly by machine. Use a pugmill, rotary drum, or other authorized mixer. Mix until cement and water are thoroughly dispersed.

You may use slurry cement backfill as structure backfill only for pipe culverts.

19-3.02F Culvert Beddings

19-3.02F(1) General

Culvert beddings must be shaped bedding, sand bedding, or soil cement bedding.

If more than 1 type of bedding is allowed, use the same bedding for the entire length of the culvert.

19-3.02F(2) Sand Beddings

Sand bedding must consist of sand:

1. Free of clay or organic material
2. Suitable for the purpose intended
3. Complying with the gradation requirements shown in the following table:

Sieve size	Percentage passing
No. 4	90–100
No. 200	0–5

19-3.02F(3) Soil Cement Beddings

Material and mixing requirements for soil cement bedding must comply with the specifications for slurry cement backfill in section 19-3.02E except:

1. It must contain at least 282 pounds of cement per cubic yard
2. Aggregate must not be commercial-quality concrete sand

19-3.02G Controlled Low-Strength Material

If authorized, controlled low-strength material may be used as structure backfill for pipe culverts unless the culvert has a diameter or span of more than 20 feet.

Controlled low-strength material must be a fluid workable mixture of aggregate, cement, and water.

Cement must be one of the following:

1. Cement complying with ASTM C150
2. Blended hydraulic cement complying with either of the following:
 - 2.1. ASTM C595
 - 2.2. Physical requirements in ASTM C1157

SECTION 19

EARTHWORK

When tested under ASTM D4832, the controlled low-strength material must have a 28-day compressive strength:

1. From 50 to 100 psi for pipe culverts with 20 feet or less in height of cover
2. Of at least 100 psi for pipe culverts with over 20 feet in height of cover

Water must be free of oil, salts, and other impurities that adversely affect the backfill.

Aggregate must be one of the following:

1. Commercial-quality concrete sand
2. Excavated or imported material in any combination, free of organic material and other deleterious substances and complying with the gradation requirements shown in the following table:

Sieve size	Percentage passing
1-1/2"	100
1"	80–100
3/4"	60–100
3/8"	50–100
No. 4	40–80
No. 100	10–40

Mix materials thoroughly by machine. A pugmill rotary drum or other authorized mixer must be used. Mix until cement and water are thoroughly dispersed.

Wherever controlled low-strength material is placed within the travelled way or covered by paving or embankment materials, the controlled low-strength material must achieve a maximum indentation diameter of 3 inches when tested under ASTM D6024 before covering and opening to traffic.

19-3.02H Concrete Backfill

Concrete backfill encasing steel soldier piles below the lagging must comply with section 90-1 and contain at least 505 pounds of cementitious material per cubic yard.

19-3.02I Lean Concrete Backfill

Lean concrete backfill must comply with the specifications for slurry cement backfill in section 19-3.02E except the aggregate must be commercial-quality concrete sand.

19-3.02J Filter Fabric

Filter fabric must be Class A.

19-3.03 CONSTRUCTION

19-3.03A General

Reserved

19-3.03B Structure Excavation

19-3.03B(1) General

Remove any material that comes into an excavation from outside the described limits.

Obtain the Engineer's acceptance of the completed structure excavation before placing any concrete or masonry.

When embankments must be constructed before culverts are placed, construct embankments to the specified height and for a distance on each side of the culvert location 5 times the culvert diameter or height before excavating for and installing culverts. Where embankments are constructed on a steep slope or at a difficult location, the Engineer may modify embankment heights before culverts are installed.

Change order work includes:

1. If structure excavation is more than 0.5 foot from the depth shown and you request an adjustment for the increased depth
2. The Engineer orders an adjustment for a decreased depth

19-3.03B(2) Soldier Pile Walls

Not Used

19-3.03B(3) Pier Column Excavation

Reserved

19-3.03B(4) Cofferdams

Not Used

19-3.03B(5) Water Control and Foundation Treatment

Select the method to remove and control water at excavations where seal courses are not shown. Methods may include well point systems, pumping sumps, cofferdams, or concrete seal courses. If you construct a seal course comply with section 51-1.03D(3) except:

1. Seal course thickness requirement does not apply for a spread footing
2. Curing requirements do not apply for a pile footing

Where concrete seal courses are shown, use a cofferdam, concrete seal course, and dewatering pumps. Place seal course concrete under section 51-1.03D(3).

If no piles are used and footing concrete, culverts, or other structures are placed on an excavated surface other than rock:

1. Perform excavation without disturbing foundation material. Dewater the excavation if groundwater is encountered and no seal course is used. Continue dewatering activities before and during subsequent excavation. Foundations must be free of water when footing concrete or pipes are placed. Continue dewatering activities as required to prevent damage to the work.
2. If foundation material is disturbed by excavation activities, damaged by water, or removed for your convenience in dewatering, restore the foundation to a condition at least equal to the undisturbed foundation. To replace damaged or removed foundation material for culverts, use Class 2 AB that complies with section 26. Compact the base as specified for structure backfill in section 19-3.03E.

If the Engineer determines the undisturbed original material of the excavation is unsuitable, correct it as ordered. This work is change order work.

If footing concrete or masonry is placed on rock, fully uncover the rock and remove the surface to sound rock. Level or cut the rock to steps and then roughen it.

Pressure grout or treat seams in rock as ordered. This work is change order work.

If you encounter solid rock or other unyielding material when excavating for a culvert other than an arch culvert, remove 1 to 5 feet of the material below the bottom of the culvert not to exceed a depth of 1/24 of the height of the embankment above the top of the culvert.

Backfill the resulting space below the culvert using structure backfill under section 19-3.03E. Excavating and backfilling below the planned elevation of the bottom of the culvert is change order work.

For footings on piles, excavate to the bottom of footings before driving piles or drilling for piling. If swell or subsidence results from pile driving, excavate or backfill the footing area to the grade of the bottom of the footing. If the material under footings would mix with footing concrete or would not support the weight of wet concrete, replace the material with suitable material, install soffit forms, or provide a platform using authorized means on which to cast the footing.

19-3.03C–19-3.03D Reserved**19-3.03E Structure Backfill****19-3.03E(1) General**

Place structure backfill in uniform layers. Bring backfill up uniformly on all sides of structures or drainage facilities. Backfill layer thickness must not exceed 0.67 foot before compacting. If you perform compaction by ponding and jetting, the thickness of the backfill layer must not exceed 4 feet.

Do not use compaction equipment or methods that may cause excessive displacement or damage structures.

Do not place structure backfill until footings or other parts of structures or drainage facilities are authorized. Do not place backfill against the back of abutments, retaining walls, or outside walls of CIP concrete structures until the concrete has attained a compressive strength of at least 2,500 psi or the concrete has been in place for 28 days.

Place backfill inside bridge wingwalls and abutments before railings on wingwalls are constructed.

Compaction by ponding and jetting may be authorized under the following conditions:

1. Backfill material is self-draining when compacted
2. Foundation materials will not soften or be damaged by water
3. Structures will not be damaged by hydrostatic pressure

Ponding and jetting of the upper 4 feet below finished grade is not allowed. Perform work without damaging the structure or embankment and such that water is not collected and confined. Supplement ponding and jetting with vibratory or other compaction equipment.

Compact structure backfill to a relative compaction of at least 95 percent except you may compact structure backfill to a relative compaction of at least 90 percent at the following locations:

1. Overside drains
2. Footings for slope protection, slope paving, and aprons
3. Headwalls, endwalls, and culvert wingwalls
4. Retaining walls, except for portions under any surfacing
5. Inlets in median areas or in traffic interchange loops
6. Footings and pumping plants not beneath surfacing

At locations where ordered, place a compacted impervious backfill material for:

1. Outer 2-foot portion of structure backfill adjacent to inlets and outlets for pipes and culverts
2. Structure backfill placed within 2 feet of finished grade at abutments, abutment wingwalls, retaining walls, and other portions of structures

Structure backfill placed at bridge supports in waterways and water channels not beneath any embankment, pavement, or slope protection:

1. Does not need to be compacted
2. Must be placed to the level of original ground or finished grade shown

Any material you place outside the excavation pay limits material must comply with the material and compaction requirements of the adjacent structure backfill.

If imported borrow is shown on the Bid Item List, you may use imported borrow as structure backfill if it complies with the specifications for structure backfill.

Place material from structure excavation not used as structure backfill in roadway embankments under section 19-6 or disposed of it under section 19-2.03B.

19-3.03E(2) Crib Walls**Not Used**

19-3.03E(3) Soldier Pile Walls**Not Used****19-3.03F Slurry Cement Backfill**

Place slurry cement backfill within 1 hour of mixing. Place it in a uniform manner that prevents (1) voids or segregation of the backfill and (2) floating or shifting of the culverts. Remove foreign material that falls into trenches.

Do not backfill over or place material over slurry cement backfill until at least 4 hours after placement. When concrete sand is used as aggregate and the in-place material is free draining, you may start backfilling as soon as the surface water is gone.

If slurry cement backfill is used for structure backfill, you may reduce the excavation width such that the clear distance between the outside of the pipe and the side of the excavation on each side of the pipe is at least (1) 6 inches for pipes 42 inches or less in diameter or span and (2) 1 foot for pipes over 42 inches in diameter or span.

Place slurry cement backfill only for that portion of structure backfill (1) below the original ground or grading plane or (2) below the top of the embankment placed before excavating for the culvert pipe. Compact earth plugs at each end of the pipe before placing the backfill to completely contain slurry in the pipe trench.

19-3.03G Pervious Backfill Material

Place pervious backfill material in layers along with and by the same methods specified for structure backfill. Pervious backfill material at the same location must have approximately the same gradation. Cover pervious backfill material at locations exposed to erosion with a 1-foot layer of an authorized earthen material.

19-3.03H Culvert Bedding

Shape trench beds to fit the bottom of the culvert and to provide uniform support along the entire culvert length. You may excavate the trench below the bottom of the culvert and construct shaped bedding by backfilling and compacting the backfill material. Shape beds using a template conforming to the outside shape of the culvert and guided by headers set parallel to the culvert grade. Headers may be left in place.

Place soil cement bedding as specified for slurry cement backfill in section 19-3.03F except do not backfill over soil cement bedding until 8 hours after placement.

19-3.03I Controlled Low-Strength Material

If a controlled low-strength material I is used for structure backfill, you may reduce the excavation width such that the clear distance between the outside of the pipe culvert and the side of the excavation on each side of the pipe culvert is at least:

1. 6 inches for pipe culverts with either of the following conditions:
 - 1.1. 20 feet or less in height of cover
 - 1.2 42 inches or less of diameter or span
2. 1 foot for pipe culverts with either of the following conditions:
 - 2.1. Over 20 feet in height of cover
 - 2.2 Over 42 inches in diameter or span

Place controlled low-strength material only for that portion of structure backfill (1) below the original ground or grading plane or (2) below the top of the embankment that is placed before excavating for the pipe. Compact earth plugs at each end of the pipe culvert before placing the backfill to completely contain slurry in the pipe culvert trench.

For trenches in existing pavement, place controlled low-strength material no higher than the bottom of the existing pavement's permeable drainage layer. Where a drainage layer does not exist, place the material no higher than 1 inch below the bottom of the existing asphalt concrete surfacing or no higher than the top of the base below the existing concrete pavement.

For rigid pipe culverts, the minimum height of controlled low-strength material relative to the pipe culvert invert must be 0.5 times the pipe culvert diameter or height.

For flexible pipe culverts, the minimum height of controlled low-strength material must be 0.7 times the pipe culvert diameter or height.

19-3.03J Soldier Pile Walls

Not Used

19-3.03K Ground Anchor and Soil Nail Walls

Not Used

19-3.04 PAYMENT

The Agency does not adjust the payment quantity of imported borrow placed as structure backfill if replacement material for the imported borrow is provided.

For structures other than culverts, if the pay limits are not shown, the payment quantities for structure excavation and structure backfill are computed as follows:

1. Horizontal limits are vertical planes 1 foot outside the neat lines of the footings or structures without footings.
2. Upper limit for structure excavation is the original ground surface. Where structure excavation is performed within a roadway excavation or a ditch excavation area, the upper limit is the plane of the bottom and side slopes of the excavated area. In new embankments, the upper limit is the plane of the new embankment at the specified elevation.
3. Upper limit for structure backfill is the finished grading plane or the finished slope lines.
4. Lower limit is a plane at the bottom of the completed footings or structures or the lower outside surface of rods or deadmen.

Except for culverts, the Agency does not adjust the unit price of structure excavation for an increase in depth of up to 2 feet or an increase in width of up to 3 times the outside width of the footing. For excavation to greater depths or widths, the Agency does not adjust the unit price of structure excavation outside the limits unless before removal activities, (1) the Engineer authorizes the excavation outside the limits to be change order work or (2) you request the excavation outside the limits to be change order work. When the pay limits of structure excavation are so increased, the pay limits for structure backfill are similarly increased. The Agency does not adjust the unit price of structure backfill.

If the depth of the structure excavation is reduced due to a reduction or elimination of the seal course, the Agency does not decrease the payment quantity for structure excavation (Type A).

The payment quantity for structure backfill does not include:

1. Volume of pervious backfill material within the limits of the structure backfill
2. Volume occupied by the new structure

For culverts:

1. Depth of structure excavation is the vertical distance between original ground and the bottom of the culvert trench.
2. Increased depth due to unsuitable material or rock or other unyielding material below the planned grade as specified in section 19-3.03H is not considered in determining the depth of structure excavation.
3. Structure excavation more than 0.5 foot from the depth shown is a work-character change if you request an adjustment for an increased depth or the Engineer orders an adjustment for a decreased depth.

19-4 ROCK EXCAVATION

Not Used

19-4.03 BLASTING

Not Used

19-4.05–19-4.08 RESERVED**19-5 COMPACTION****19-5.01 GENERAL**

Section 19-5 includes specifications for compacting all earthwork except structure backfill.

19-5.02 MATERIALS

Not Used

19-5.03 CONSTRUCTION**19-5.03A General**

Relative compaction specifications apply to material whether in an excavation or an embankment.

The moisture content of material to be compacted to at least 95 percent must be such that the specified relative compaction is attained and the embankment is in a firm and stable condition.

Do not compact material that contains excessive moisture until the material is dry enough.

19-5.03B Relative Compaction (95 Percent)

Compact earthwork to a relative compaction of at least 95 percent for at least a depth of:

1. 0.5 foot below the grading plane for the width between the outer edges of shoulders
2. 2.5 feet below the finished grade for the width of the traveled way plus 3 feet on each side

Except for the outer 5 feet measured horizontally from the embankment side slope, compact the full width and depth of the embankment within 150 feet of each bridge abutment to at least 95 percent relative compaction. The 150-foot limit is measured horizontally from the bridge abutment and either parallel or concentric with the roadway centerline.

Compact earthwork to a relative compaction of at least 95 percent for embankments under retaining wall footings without pile foundations:

1. For the full depth of the embankment
2. Within the limits established by inclined planes sloping 1.5:1 (horizontal: vertical) out and down from lines 1 foot outside the bottom edges of the footing

19-5.03C Relative Compaction (90 Percent)

Compact earthwork to a relative compaction of at least 90 percent in embankment areas not required to be compacted to 95 percent.

19-5.03D Foundation Preparation

You are responsible for preparing the foundation to receive material.

You may excavate and replace basement material to facilitate compaction. Before you replace the basement material, if ordered, compact a layer below the excavated material to a depth, width, and degree of compaction ordered. The ordered work is change order work.

19-5.04 PAYMENT

If basement material is (1) placed in the embankment or used in other planned or authorized work and (2) replaced with planned excavated material or imported borrow, the replaced material is paid for at the item bid price for the type of excavation or imported borrow involved.

19-6 EMBANKMENT CONSTRUCTION

Not Used

19-7 BORROW MATERIAL

Not Used

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19-8 RESERVED

19-9 SHOULDER BACKING

Not Used

19-10 SUBGRADE ENHANCEMENT GEOSYNTHETIC

Not Used

19-11–19-30 RESERVED

Replace section 20 with:

20 LANDSCAPE

20-1 GENERAL

20-1.01 GENERAL

20-1.01A Summary

Section 20 includes general specifications for performing landscaping work.

Perform roadside clearing:

1. As required to prepare the job site for construction work
2. Until the start of the plant establishment work or Contract acceptance, whichever comes first

Do not begin landscaping until authorized. Authorization is provided after all other improvements have been satisfactorily installed and inspected by the Engineer.

Locate all underground utilities and take all proper precautions prior to excavating for planting or placing of plant materials. Notify the Engineer of conflicts between utilities and plant material locations. The Engineer may arrange for the relocation of one or the other.

You are responsible for the repair of damage caused by your work.

Comply with the requirements for the protection and preservation of property as described elsewhere in the specifications. Do not drive vehicles over curbs, sidewalks, planting areas, etcetera, unless proper protection is provided.

~~Check for plant deficiencies under section 20-10.03A(4) before installing any irrigation system in an existing planting area to be maintained.~~

~~Unless a supply line is shown through plant holes, relocate any plant hole to clear a supply line.~~

~~Do not install supply lines, control and neutral conductors, and electrical conduits in common trenches above each other.~~

20-1.01B Definitions

Not Used

20-1.01C Submittals

Submit evidence demonstrating the qualifications of personnel and firms required under section 20-1.01D. Include a list of projects completed by the representative firm(s) and personnel.

No later than 30 days after Contract award, submit three bound booklets. Each booklet must have separate sections that are tabbed, labeled and organize the following information:

1. Product certificates signed by manufacturers certifying that their products comply with specified requirements. Certificates must be legible and include grades, analysis, amount, supplier, species, type, size and quantity where applicable.
2. Manufacturer's certified analysis for standard products.
3. Analysis for other material by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
4. ~~Label data substantiating that plants, trees, shrubs, and planting materials comply with specified requirements.~~
5. ~~Soil amendment receipts containing analytical data.~~
6. Receipts from the soil supplier for all specified soil mixes imported soil and compost.
7. Soil analyses and testing by an independent laboratory for soil fertility and an evaluation of percolation. Analyses must include an evaluation of soluble salts, pH, texture, and organic matter content. Analysis must state recommended amendments and procedures required to create planting soil. Analysis must describe any other top soil qualities which may be detrimental to plant growth and health. Test:

- ~~a. Existing soil, prior to application of amendment, if proposed to be used as planting soil. Two samples may be taken at the location directed by the Engineer.~~
- ~~b. Imported soil if used as planting soil or compost amendment.~~
- 8. List of all proposed landscape materials indicated by description, manufacturer, and model number. Include catalog cuts and manufacturer's current printed instructions of all material items.
- ~~9. List of all trees, indicated by botanical name, common name, height, spread, caliper, container size, nursery, and location, contact person at nursery, and any specific remarks (ie. unable to locate, photo submitted, etc.).~~
- ~~10. Color photographs of each tree type. Include a person or ruler in each photograph for scale purposes. Digital photographs are acceptable. Approval of photographs does not indicate acceptance of plant material on site.~~
- ~~11. Planting schedule, indicating anticipated dates and locations for each type of planting.~~

~~No later than 30 days after Contract award, submit two sets of the following physical samples in resealable, labeled plastic bags (as applicable):~~

- ~~1. One tree tie and/or tree guy of each type to be used.~~
- ~~2. One pound bag of decomposed granite of the color specified~~
- ~~3. One copy of manufacturer's descriptive literature for stabilizer.~~
- ~~4. One half cubic foot of imported planting soil.~~

~~At least 15 days before applying any pesticide, submit a copy of the pest control adviser's recommendation.~~

~~At the end of each week, submit a Report of Chemical Spray Operations form as an informational submittal documenting the application of all pesticides.~~

~~Before mixing a pesticide, submit a copy of the registered label for the pesticide as an informational submittal. If you are unable to copy the label, allow the Engineer to read the label on the container.~~

20-1.01D Quality Assurance

20-1.01D(1) General

Landscape related work must be performed under the supervision of a licensed landscape contractor with a valid C-27 license.

Maintain an experienced, full time landscape superintendent on site during the time that landscaping operations are in progress. The superintendent must be authorized to represent you. The superintendent must not be changed except as authorized by the Engineer.

~~Obtain a recommendation for the use of all pesticides under the Food & Agri Code from a pest control advisor who is licensed as an agricultural pest control advisor in the State. The recommendation must include the pesticides to be used, rates of application, methods of application, and application areas.~~

~~The pesticide applicator must have an active and valid qualified applicator license or certificate from the Department of Pesticide Regulation.~~

~~Only an independent test agency that conforms to ASTM E699 and has the experience and capability to satisfactorily conduct the required testing may be authorized to do so.~~

20-1.01D(2) Progress Inspections

The Engineer performs progress inspections:

- 1. After marking plant locations
- ~~2. Before cultivating work starts~~
- ~~3. Before pressure testing of irrigation pipe on the supply side of control valves~~
- ~~4. Before testing of low voltage control and neutral conductors~~
- ~~5. During irrigation system functional tests~~

6. Before planting the plants
7. Before completion of planting work
8. Before the start of plant establishment work
9. Once a month during the plant establishment period

Notify the Engineer at least 4 business days before each inspection is required. Allow at least 3 business days for the Engineer's inspection.

Do not proceed with the next construction activity until the inspection has been completed and any required corrective work has been performed and authorized.

20-1.02 MATERIALS

20-1.02A General

Not Used

20-1.02B Water

~~Unless there is a bid item for irrigation water service charges, the~~ This project will require truck or hand watering. The Agency furnishes water if it is available from an existing County/District-owned facility within the project limits ~~or an irrigation system to be installed under the Contract.~~

If water is not available from one of these sources, make arrangements for supplying water. Water must be of a quality that promotes plant growth.

20-1.02C Pesticides

~~Pesticides must comply with the regulations of the Department of Pesticide Regulation.~~

~~Insecticide must be imidacloprid.~~

~~Redenticides must be brodifacoum, bromadiolone, or diphacinone.~~

~~Do not use pelleted forms of pesticides for weed control.~~

~~For weed control, use a pesticide with a photosensitive dye that produces a contrasting color when sprayed on the ground. The color must disappear within 2 to 3 days after being applied. The dye must not stain surfaces or injure plants or wildlife when applied at the manufacturer's recommended application rate.~~

Do not use pesticides. For weed control, hand pull weeds.

20-1.02D–20-1.02H Not Used

20-1.03 CONSTRUCTION

20-1.03A General

~~Coordinate all drainage work with other trades. Maintain established site drainage during all phases of landscape construction.~~

Grading and soil preparation work must only be performed during the period when beneficial and optimum results may be obtained. If the moisture content of the soil should reach such a level that working it would destroy soil structure or cause compaction, spreading and grading operations must be suspended, until in the opinion of the Engineer, the moisture content is at acceptable levels and the desired results are likely to be obtained.

~~Take precautions to prevent irrigation water from:~~

- ~~1. Wetting vehicles, pedestrians, and pavement~~
- ~~2. Eroding soil~~
- ~~3. Causing excess runoff~~

~~If water use calculations are provided as supplemental project information, water plants under the Model Water Efficient Landscape Ordinance, 23 CA Code of Regs § 490 et seq., and local water agency provisions.~~

~~Water plants at night unless otherwise authorized.~~

Dispose of removed, pruned, and damaged vegetative material.

~~You may reduce removed vegetative material to chips with a maximum thickness of 1/2 inch and spread it within the job site at locations determined by the Engineer.~~ Do not substitute chipped material for wood mulch or place it in areas to receive wood mulch.

20-1.03B Pesticides

~~Notify the Engineer of pesticide application times at least 24 hours before each application.~~

~~Mix and apply pesticides under the regulations of the Department of Pesticide Regulation and the instructions on the pesticide product label.~~

~~Do not apply pesticides:~~

- ~~1. On Saturdays and holidays unless authorized~~
- ~~2. Whenever weather and wind conditions are unsuitable for application~~
- ~~3. Within the plant basin~~
- ~~4. On the foliage and woody parts of the plant~~

~~Any granular preemergent must be covered with mulch on the same work day. Do not apply granular preemergent in plant basins.~~

~~Do not apply preemergents:~~

- ~~1. To groundcover plants within 3 days after planting~~
- ~~2. Within 18 inches of trees, shrubs, and seeded areas~~
- ~~3. Before plants have been thoroughly watered~~

20-1.03C Roadside Clearing

20-1.03C(1) General

Roadside clearing includes:

1. Removing existing plants described to be removed
- ~~2. Controlling weeds and pests~~

~~Control rodents by using rodenticides or traps.~~

20-1.03C(2) Remove Existing Plants

Removal of existing plants includes removing their stumps and roots 2 inches or larger in diameter to a minimum depth of 12 inches below finished grade. Backfill holes resulting from stump removal to the finished grade with material obtained from adjacent areas.

If a plant is to be planted within an existing groundcover area, remove the existing groundcover from within an area 6 feet in diameter centered at each plant location.

The site to be landscaped must be free of weeds, native grasses, Bermuda grass, and Kikuyu grass prior to any planting or soil amendment placement.

20-1.03C(3) Weed Control

Control weeds by the use of **pesticides**, hand-pulling, ~~or mowing. Use pesticides only when authorized.~~

~~If pesticides are used to control weeds, apply pesticides before the weeds reach the seed stage of growth or exceed 4 inches in length, whichever occurs first. Do not use pesticides at cutting plant locations.~~

~~Where cuttings are to be planted, control weeds by hand pulling within an area 2 foot in diameter centered at each plant location.~~

~~If woods are to be controlled by hand pulling, hand pull weeds before they reach the seed stage of growth or exceed 4 inches in length, whichever occurs first.~~

~~Where liner, plug, or seedling plants are to be planted 10 feet or more apart, control weeds by the use of pesticides or hand pulling within an area 2 feet in diameter centered at each plant location. Where liner, plug, or seedling plants are to be planted less than 10 feet apart, control weeds by the use of pesticides within the entire area.~~

~~Control weeds by mowing outside of mulched areas, plant basins, groundcover areas, and within areas to be seeded. Mowing must extend to the edges of pavement, dikes, curbs, sidewalks, walls, and fences.~~

~~If mowing is to be performed within areas to be seeded, perform mowing as needed until the start of the seeding activity.~~

~~Perform mowing before the weeds reach the seed stage of growth or exceed 6 inches in length, whichever occurs first. Mow weeds to a height of 3 inches.~~

20-1.03C(4) Disposal of Removed Groundcover, Weeds, and Mowed Material

Dispose of hand-pulled weeds the same day they are pulled. Dispose of removed groundcover within 3 days.

~~Dispose of mowed material from the initial mowing. Disposal of material from subsequent mowing is not required.~~

20-1.03D Cultivation

~~Cultivation must be by mechanical methods and performed~~ Cultivate the soil until the soil is in a loose condition to a minimum depth of 6 inches. Soil clods must not be larger than 2 inches in maximum dimension after cultivation.

~~The areas to be cultivated must extend 12 inches beyond the outer limit of each planting area requiring cultivation.~~

~~After initial cultivation, place soil amendment and fertilizer at specified rates.~~

~~Recultivate to thoroughly mix native soil and amendments.~~

~~Do not drive on cultivated areas after cultivation.~~

~~Planting areas that have been cultivated and become compacted must be recultivated.~~

~~Rocks and debris encountered during soil preparation in planting areas must be brought to the ground surface.~~

~~Remove rocks and debris as ordered. This work is change order work when it is agreed that removal requires special effort and extra expense.~~

20-1.03E Weed Germination

Not Used

20-1.03F–20-1.03K Not Used

20-1.04 PAYMENT

The payment quantity for landscape bid items paid for by the area is the area measured parallel to the ground surface.

The payment quantity for cultivation includes the area not cultivated within the cultivation area shown.

20-2 IRRIGATION

Not Used

20-3 PLANTING**20-3.01 GENERAL****20-3.01A General****20-3.01A(1) Summary**

Section 20-3.01 includes general specifications for performing planting work.

Immediately upon award of Contract, locate and purchase or hold for purchase all plant material as required. ~~Trees may be purchased and contract grown to ensure pruning practices are met.~~

Quantities of plant materials listed are for your convenience only and are not guaranteed. Verify count and furnish a sufficient number of plant material as needed to fulfill the intent and to complete the Work as shown. Plan plant symbol quantities take precedence over quantities indicated in the Plant List and Plan callouts.

20-3.01A(2) Definitions

Not Used

20-3.01A(3) Submittals**20-3.01A(3)(a) General**

Submit nursery invoices showing sizes, quantities, and botanical names of plants, including genus, species, and variety. Include lot numbers for plants grown from the same seed lot or cutting source.

~~If a root stimulant is required, submit a copy of the root stimulant manufacturer's product sheet and instructions for the application of the root stimulant.~~

~~If cuttings are to be taken from outside the right-of-way, submit proof of permits and payment of associated fees. Notify the Engineer of the location at least 15 days before taking cuttings.~~

20-3.01A(3)(b) Vendor Statements

At least 60 days before planting the plants, submit a statement from the vendor that the order for the plants required, including sample plants used for inspection, has been received and accepted by the vendor. The statement from the vendor must include the plant names, sizes, quantities, and anticipated delivery date.

20-3.01A(3)(c) Certificates of Compliance

Submit a certificate of compliance for import soil ~~seed and soil amendment~~.

20-3.01A(4) Quality Assurance

Plants must comply with federal and State laws requiring inspection for diseases and infestations. Inspection certificates required by law must accompany each shipment of plants.

The Engineer inspects the roots of container-grown sample plants by removing earth from the root ball of not less than 2 plants, nor more than 2 percent of the total number of plants of each species or variety. If container-grown plants are purchased from several sources, the Engineer inspects the roots of not less than 2 of each sample plant species or variety from each source. The root ball of container grown plants must not show evidence of having been restricted, or being underdeveloped or deformed.

If the Engineer finds noncompliant plants, the entire lot represented by the noncompliant sample plants is rejected.

~~Cuttings with mature or brown stems and cuttings that have been trimmed will be rejected.~~

20-3.01B Materials**20-3.01B(1) General**

Verify with the Engineer as to whether any plant material stock has been nursery contract grown for use within Work of this Contract.

Notify the Engineer at least 10 days before the plants are shipped to the job site.

Review the condition of the plant material with the Engineer at the nursery maintaining the plant material, and at the time of delivery to the Project site.

~~Do not prune trees and shrubs prior to delivery.~~

At the discretion of the Engineer, trees and other plant material may be reviewed, photographed, and tagged by the Engineer at the nursery or other place of growth prior to delivery to the Project site. Verify with the Engineer if tagging operations are required.

Tagging of plant material at the nursery or place of growth does not cancel the right of the Engineer to reject plant material at the Project site if damaged or other unacceptable conditions are found that were not detected at the nursery, place of growth, or in photographs.

Spray plant materials in full leaf immediately before transporting with anti-desiccant. Adhere to the anti-desiccant manufacturer's application instructions.

Provide protective covering during delivery. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape.

Deliver packaged materials in containers showing weight, analysis, and name of manufacturer. Protect materials from deterioration during delivery and while stored at site.

20-3.01B(2) Plants

20-3.01B(2)(a) General

Plants must be true to the type or name shown. Plants must be individually tagged or tagged in groups identifying the plants by species or variety. Tagging is not required for cuttings.

Plants must be healthy, well-formed, having normal, well-developed branch systems, and vigorous fibrous root systems, which are neither root- nor pot-bound, and are free of kinked, gnarled, or girdling roots. Container stock must have grown in the containers in which they are delivered for at least six months, but not over two years.

Plants must be free from insect pests, eggs and larvae, and disease, and grown in nurseries inspected by the Department of Food and Agriculture.

Plants must not have fresh bark abrasions, excessive abrasions, windburn, saltburn, or other objectionable disfigurements or conditions ~~be root-bound~~.

The plants must be the size and type shown in the following table:

Plant group designation	Description	Container size (cu in)
A	No. 1 container	152–251
B	No. 5 container	785–1242
C	Balled and burlapped	--
E	Bulb	--
F	In flats	--
H	Cutting	--
I	Pot	--
K	24-inch box	5775–6861
M	Liner ^a	--
O	Acorn	--
P	Plugs ^{a, b}	--
S	Seedling ^c	--
U	No. 15 container	2768–3696
Z	Palm Tree	--

^aDo not use containers made of biodegradable material.

^bGrown in individual container cells.

^cBare root.

~~Measure trees according to ANSI Z60.1 with branches and trunks or canes in their normal position. Do not prune to obtain required sizes.~~

~~Take caliper measurements six inches above ground for trees up to four inch diameter size, and twelve inches above ground for larger sizes.~~

~~Before installing trees, measure the main body for height and spread; do not measure branches or roots tip to tip.~~

~~Trucks used for transporting plants must be equipped with covers to protect plants from windburn and sunburn.~~

~~Pruning of trees as grown at the nursery must meet the requirements outlined by the International Society of Arboriculture's "Tree Pruning Standards." Handle and pack plants using authorized methods appropriate for the species or variety.~~

20-3.01B(2)(b) Cuttings

Not Used

20-3.01B(2)(c) Sod

Not Used

20-3.01B(3) Soil Amendments

20-3.01B(3)(a) General

Soil amendment must comply with the provisions in the Food & Agri Code ~~and as specified in the special provisions.~~

Planting soil must consist of a mixture of sand and aged compost material, proportioned as follows:

1. 50-60% sand
2. 30-40% organic compost material
3. 10% sandy loam

Planting soil must conform to the following quality requirements:

1. pH in the range of 6.5 to 7.8

2. salinity of less than 6.0 mmhos/cm
3. sustainable infiltration rate of at least 5.0 inches per hour

20-3.01B(3)(b) Submittals

Before delivery of compost/planting soil, the supplier must submit a copy of lab analysis performed by a laboratory that is enrolled in the US Composting Council's Compost Analysis Proficiency (CAP) program and using approved Test Methods for the Evaluation of Composting and Compost (TMECC). The lab report must verify that:

1. compost material includes one or more of: landscape/yard trimmings, grass clippings, food scraps, and agricultural crop residues
2. nutrient content includes N-P-K, Ca, Na, Mg, S, and B.

Submit results from an independent accredited soil testing laboratory on a representative sample of proposed planting soil for a test conducted no earlier than 6 months prior to the submittal date.

Submit for review and approval, 1/2 cubic foot mixed, representative planting soil sample for independent testing.

20-3.01B(3)(c) Sand

Sand for use in planting soil must comply with section 90-1.02C(3) and the gradation requirements in the following table:

<u>Sieve size</u>	<u>Percent passing</u>
<u>3/8 inch</u>	<u>100</u>
<u>No. 4</u>	<u>90-100</u>
<u>No. 8</u>	<u>70-100</u>
<u>No. 16</u>	<u>40-95</u>
<u>No. 30</u>	<u>15-70</u>
<u>No. 50</u>	<u>5-55</u>
<u>No. 100</u>	<u>5-15</u>
<u>No. 200</u>	<u>2-5</u>

20-3.01B(3)(d) Compost

Compost material for use in planting soil must be a well decomposed, stable, weed free organic matter derived from waste materials including yard debris, wood wastes or other organic materials not including manure or biosolids meeting the standards developed by the US Composting Council (USCC). The product shall be certified through the USCC Seal of Testing Assurance (STA) Program.

Compost material must conform to the following quality requirements:

<u>Parameter</u>	<u>Values</u>
<u>Carbon/Nitrogen Ratio</u>	<u>15:1 min 25:1 max</u>
<u>Stability (one of the following):</u> <u>Oxygen</u> <u>Spec. Oxygen</u> <u>Respiration Test</u> <u>Dewar Test</u> <u>Solvita Maturity Index</u>	<u>20C max</u> <u>5 min</u>
<u>Toxicity (one of the following):</u> <u>NH4</u> <u>Ammonium</u> <u>Seed Germination</u> <u>Plant Trials</u> <u>Solvita Maturity Index</u>	<u>500 ppm max</u> <u>80% min</u> <u>80% min</u> <u>5 min</u>
<u>Nutrient Content:</u> <u>Total Nitrogen</u> <u>Boron (total)</u> <u>Boron (soluble)</u>	<u>0.9% min</u> <u>80 ppm max</u> <u>2.5 ppm max</u>

Compost material must meet the following gradation requirements:

<u>Sieve size</u>	<u>Percent passing (by weight)</u>
<u>1 inch</u>	<u>99 - 100</u>
<u>½ inch</u>	<u>90 - 100</u>
<u>¼ inch</u>	<u>40 - 90</u>
<u>No. 200</u>	<u>2 - 10</u>

Compost material must meet these additional requirements:

<u>Parameter</u>	<u>Values</u>
<u>Bulk Density (lb/cy). dry</u>	<u>500 min 1100 max</u>
<u>Moisture Content</u>	<u>30% min 55% max</u>
<u>Pathogens:</u> <u>Salmonella</u> <u>Coliform Bacteria</u>	<u>3 MPN / 4 grams TS max</u> <u>10.000 MPN/gram max</u>

Compost must not exhibit a sour or putrid smell, contain recognizable grass or leaves, or be hot (>120 degrees F) upon delivery. Rewetting is prohibited.

20-3.01B(4) Fertilizers

Not Used

20-3.01B(5) Root Stimulants

Not Used

20-3.01B(6) Plaster Sand

Not Used

20-3.01B(7) Root Barrier

Not Used

20-3.01B(8) Root Protectors

Not Used

20-3.01B(9) Foliage Protectors

Not Used

20-3.01B(10) Wood Plant Stakes

Not Used

20-3.01B(11) Plant Ties

Not Used

20-3.01B(12) Deep Watering Tubes

Not Used

20-3.01C Construction**20-3.01C(1) General**

Not Used

20-3.01C(2) Pruning

Not Used

20-3.01C(3) Watering

Water plants as needed to keep the plants in a healthy growing condition.

20-3.01C(4) Replacement Plants

Plants that show signs of failure to grow at any time or which are so injured or damaged as to render them unsuitable for the purpose intended, must be removed, replaced, and replanted. Replace unsuitable plants within 2 weeks after the Engineer marks or indicates that the plants must be replaced.

Replacement planting must comply with the original planting specifications, sizes and spacing described for the plants being replaced.

~~Replacement planting for transplanted trees must comply with the work plan and be planted in the same planting hole.~~

Replacement ground cover plants must be the same species specified for the ground cover being replaced. Other replacement plants must be the same species as the plants being replaced.

Place orders for replacement plants with the vendor at a time such that the replacement plants are not in a root-bound condition.

The Agency does not pay for replacement plants or the planting of replacement plants.

20-3.01C(5) Maintain Plants

Maintain plants from the time of planting until Contract acceptance.

20-3.01D Payment

Not Used

20-3.02 PLANTING WORK**20-3.02A General**

Section 20-3.02 includes specifications for planting plants.

20-3.02B Materials

Not Used

20-3.02C Construction**20-3.02C(1) General**

Do not start planting until authorized.

If an irrigation system is required, do not start planting in an area until the functional test has been completed and authorized for the irrigation system serving that area.

20-3.02C(2) Preparing Planting Areas

The Engineer may designate a location other than that shown, in which case, the Engineer marks the location by a stake, flag, or other marker.

Conduct work such that the existing flow line in drainage ditches is maintained. Material displaced by your activity that interferes with drainage must be removed.

~~Where a minimum distance to a drainage ditch is shown, locate the plant such that the outer edge of its basin wall is at least the minimum distance shown for each plant involved.~~

Excavate each planting hole by manual or machine method. The bottom of each planting hole must be flat. Do not use water to excavate the hole.

~~Unless a larger planting hole is described, the planting hole must be large enough to receive the root ball or the total length and width of roots, backfill, amendments, and fertilizer. Where rock or other hard material prohibits the hole from being excavated, a new hole must be excavated and the abandoned hole backfilled.~~

20-3.02C(3) Planting Plants**20-3.02C(3)(a) General**

Not Used

20-3.02C(3)(b) Trees, ~~Shrubs~~, and Vines

Not Used

20-3.02C(3)(c) Shrubs and Groundcover Plants

~~Each groundcover planting area irrigated by a single control valve must be completely planted and watered before planting other groundcover planting areas.~~

Plant shrubs and groundcover plants in moist soil, and in neat, straight rows parallel to the nearest roadway. Stagger plants in adjacent rows.

~~Apply fertilizer to groundcover plants and water into the soil immediately after planting.~~

20-3.02C(3)(d) Cuttings, Liners, Plugs, and Seedling Plants

Not Used

20-3.02C(3)(e) Sod

Not Used

20-3.02D Payment

~~The payment quantity for soil amendment is the volume measured in the vehicle at the point of delivery.~~

~~The payment quantity for slow release fertilizer, organic fertilizer, or iron sulfate (lb) is the weight determined from the marked weight or sack count.~~

The payment quantity for plants is measured by either the product of the average plant density and the total planted area, or by a count of the living plants in place. The payment quantity for plants includes all of the material and construction work shown and described under section 20-3. Required planting soil/amendments/compost will not be measured.

~~The payment quantity for root barrier is the length installed measured to the nearest 0.1 foot.~~

20-3.03–20-3.07 NOT USED

20-4 PLANT ESTABLISHMENT WORK

20-4.01 GENERAL

20-4.01A Summary

Section 20-4 includes specifications for performing plant establishment work.

Plant establishment consists of caring for the plants, including:

1. Controlling plant growth
2. Fertilizing
3. Controlling weeds and pests
4. Replacing damaged or diseased plants
5. Watering
- ~~6. Operating irrigation system~~
- ~~7. Repairing new irrigation system~~
8. Repairing erosion
9. Repairing vandalism

~~Working days on which no work is required are credited as plant establishment working days regardless of whether or not you perform plant establishment work.~~

~~If any component of the electric automatic irrigation system is operated manually, the day will not be credited as a plant establishment working day unless the manual operation is authorized.~~

~~Working days on which you fail to adequately perform plant establishment work are not credited as plant establishment working days.~~

20-4.01B Definitions

Not Used

20-4.01C Submittals

20-4.01C(1) General

Submit seasonal watering schedules for use during the plant establishment period within 10 days after the start of the plant establishment period. ~~Remote irrigation control system watering schedule must use the remote irrigation control system software program.~~

Submit updated watering schedules within 5 business days after any changes have been made to the authorized schedules.

~~Submit a revised watering schedule for each irrigation controller at least 30 days before completion of the plant establishment period.~~

Record all maintenance activities and observations in a monthly maintenance log book and submit on a quarterly basis. Record activities pertaining to the subsections of section 20-4.03 and present the information in the same order.

20-4.01C(2) Notification

The plant establishment period typically starts upon acceptance of the Project. The Engineer notifies you otherwise, when the plant establishment period starts and furnishes statements regarding the number of working days credited to the plant establishment period after the notification.

~~Notify the Engineer at least 5 business days before applying each application of fertilizer.~~

20-4.01C(3) Plant Establishment Period Maintenance Bond

At least 30 days before the anticipated acceptance date of the project, submit a separate maintenance bond for the plant establishment period.

The bond must:

1. Be a surety bond executed by a corporation licensed to transact business in California
2. Be issued at your expense
3. Be maintained throughout the plant establishment period
4. Be secured in the amount of 100 percent of the total contract price bid for all landscape items listed in the table below
5. Guarantee the faithful maintenance of the items listed in the table below
6. Insure the County during the entire duration of the plant establishment period

<u>Item No</u>	<u>Item Description</u>
<u>12</u>	<u>Plant – 1 Gallon</u>
<u>13</u>	<u>Plant – 5 Gallon</u>
<u>15</u>	<u>Rock Mulch</u>
<u>16</u>	<u>Wood Mulch</u>

The maintenance bond is specific for those landscape items listed and is separate from the entire project.

20-4.01D Quality Assurance

~~Provide training by a qualified person on the use and adjustment of the installed irrigation controllers no more than 30 days before completion of the plant establishment period.~~

Meet with the Engineer on a quarterly basis during the Plant Establishment Period to review the work. Make monthly maintenance log book available for review.

Periodic unscheduled inspections may be made by the Engineer to ensure that proper maintenance is being conducted. You will be given three calendar days to complete any corrective action. The Plant Establishment Work period may be extended if planted areas are not properly maintained or other corrective work is not completed as ordered.

Perform a final inspection of the plant establishment work in the presence of the Engineer 20 to 30 days before the end of the plant establishment period.

20-4.02 MATERIALS

20-4.02A General

Not Used

20-4.02B Fertilizers

Not Used

20-4.03 CONSTRUCTION

20-4.03A General

Planting must minimally be reviewed and maintained on weekly basis. Replace dead plants immediately with plants of the same species and size as described under section 20-4.03F. Examine conditions of each plant, planting basin, staking, water tubes, weed growth and mulch. Record observations and actions taken in maintenance log, including high resolution photos documenting conditions.

Fill in any soil subsidence that may occur; replant trees and shrubs that may have settled.

Dispose of surplus earth accumulated in roadside clearing and planting areas.

Remove the tops of foliage protectors if plants become restricted.

~~Remove foliage protectors, including support stakes, within 30 days before the completion of the plant establishment period.~~

Keep plant basin walls well formed.

~~Clean new wye strainers and existing wye strainers that are a part of the new irrigation system annually until the completion of the plant establishment period. The last cleaning must be done within 15 days before the completion of the plant establishment period.~~

~~Remove, clean, and reinstall new filters and existing filters that are a part of the new irrigation system annually until the completion of the plant establishment period. The last cleaning must be done within 15 days before the completion of the plant establishment period.~~

20-4.03B Plant Growth Control

~~Trim and mow turf areas as specified for sod in section 20-3.02C(3)(e). Dispose of trimmed and mowed material.~~

~~If irregular or uneven areas appear within turf areas, restore to a smooth and even appearance. Reseed turf seed areas.~~

Prune plants planted as part of the Contract as authorized. Comply with section 20-3.01C(2).

Remove plant growth that extends within 2 feet of sidewalks, curbs, dikes, shoulders, walls or fences.

Remove new and existing ground cover from within the plant basins, including basin walls, turf areas, and planting areas within edging.

~~Vines adjacent to walls and fences must be kept staked and tied. Train vines on fences and walls or through cored holes in walls.~~

~~No gas powered edgers or leaf blowers will be operated before 9:00 AM or after 4:00 PM, and within half an hour after school dismissal on a school day.~~

20-4.03C Fertilizing

Not Used

20-4.03D Weed and Debris Control

Keep all planting areas free from weeds, paper, glass, debris and trash during the entire duration of the Contract. Clear the planting area a minimum of once a week.

Control weeds under section 20-1.03C(3). Weeds within planter strips and planting areas must be controlled by hand pulling.

At the end of the maintenance work day, inspect and clean sidewalks and other areas within the limits of work of soil, other debris or materials originating from the landscaped area or resulting from plant establishment maintenance activities.

20-4.03E Plant Staking

Not Used

20-4.03F Replacement Plants

Replacement plants must comply with section 20-3.01C(4).

Replacement of plants up to and including the 125th plant establishment working day must be with a plant of the same size as originally specified. Plants of a larger container size than those originally specified for replacement plants may be used during the first 125 working days of the plant establishment period.

Plants replaced after the 125th plant establishment working day must be the size shown in the following table:

Plant size (Original)	Plant size (Replacement)
Pot/liner/plug/seedling	No. 1 container
No. 1 container	No. 5 container
No. 5 container	No. 15 container

Other replacement plants must be the same size as originally specified.

Replacement ground cover plants must have the spacing shown in the following table:

Original spacing (inches)	On center spacing of replacement ground cover plants (inches)		
	Number of completed plant establishment working days		
	1–125	126–190	191–End of plant establishment period
9	9	6	6
12	12	9	6
18	18	12	9
24	24	18	12
36	36	24	18

20-4.03G Watering

Examine the soil moisture around each plant to ensure adequate moisture. Record all watering applications and include an approximation of amounts applied and any modifications.

~~All plants must be irrigated to provide adequate water to maintain an attractive, green, healthy and moderate growth rate during its growing season. Comply with the water budget approach to irrigation scheduling to match plant need with water application and avoid over irrigation.~~

Watering of plant materials should encourage deep rooting by watering in a manner that the soil profile is wetted to a continuous depth of at least three inches when tested with a soil probe.

~~Operate any the electric automatic irrigation systems, including external weather and other system data inputs required to operate the system in automatic mode, unless otherwise authorized. Water plants utilizing the remote irrigation control system software program unless authorized.~~

20-4.03H Mulching

Maintain a minimum of 3 inches of mulch at all times over soil surface that is not covered by vegetation. Keep mulch 6 inches away from tree trunks and 4 inches away from shrub stems.

20-4.03I Integrated Pest Management

Monitor all plant materials for insects, pests, disease on a weekly basis and establish acceptable levels of Integrated Pest Management with the Engineer. Utilize the least toxic method of effective control. All use of chemicals must be by qualified, licensed personnel following State regulations and manufacturer's instructions and safety recommendations.

20-4.04 PAYMENT

Not Used

20-5 LANDSCAPE ELEMENTS

20-5.01 GENERAL

20-5.01A General

Section 20-5.01 includes general specifications for constructing and installing landscape elements.

Earthwork must comply with section 19.

20-5.01B Materials

Not Used

20-5.01C Construction

Not Used

20-5.01D Payment

Not Used

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20-5.02 EDGING

Not Used

20-5.03 INERT GROUND COVERS

20-5.03A General

20-5.03A(1) General

20-5.03A(1)(a) Summary

Section 20-5.03A includes general specifications for placing inert ground covers.

20-5.03A(1)(b) Definitions

Not Used

20-5.03A(1)(c) Submittals

Not Used

20-5.03A(1)(d) Quality Assurance

Not Used

20-5.03A(2) Materials

Not Used

20-5.03A(3) Construction

20-5.03A(3)(a) General

Before installing inert ground cover, remove plants and weeds to the ground level.

20-5.03A(3)(b) Earthwork

Not Used

20-5.03A(3)(c) Treatment of Soil

After compaction, apply preemergent at the maximum label rate. Do not apply preemergent more than 12 inches beyond the inert ground cover limits. Complete the preemergent application and inert ground cover placement within the same day.

20-5.03A(3)(d) Filter Fabric

Not Used

20-5.03A(4) Payment

Not Used

20-5.03B Rock Blanket

20-5.03B(1) General

20-5.03B(1)(a) Summary

Section 20-5.03B includes specifications for placing rock blanket.

20-5.03B(1)(b) Definitions

Not Used

20-5.03B(1)(c) Submittals

Not Used

20-5.03B(1)(d) Quality Assurance

Not Used

20-5.03B(2) Materials

20-5.03B(2)(a) General

Do not use filter fabric.

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20-5.03B(2)(b) Concrete

Concrete must be minor concrete.

20-5.03B(2)(c) Rock

Rock must be clean, smooth, obtained from a single source, and must comply with the following gradation requirements:

Gradation Requirements	
Screen size (inches)	Percentage passing
8	100
6	50-85
4	0-50

You may use rock with superficial chipping or jagged edges if the rock is placed such that the chipped areas and jagged edges are submerged in the concrete.

20-5.03B(2)(d) Mortar

Mortar must comply with section 51-1.02F.

20-5.03B(3) Construction

Rock must be placed while concrete is still plastic. Remove concrete adhering to the exposed surfaces of the rock. Rock that is exposed on the finished surface must be round, smooth, clean and without jagged edges or chipped areas showing. If you are ordered to remove existing concrete below ground within the limits of the rock blanket, saw cut the concrete before removal. This work is change order work.

Loose rocks or rocks with a gap greater than 3/8 inch must be reset by an authorized method. The rock gap is measured from the edge of the rock to the surrounding concrete bedding.

20-5.03B(4) Payment

The payment quantity for rock blanket is the area measured parallel to the surface of the rock blanket.

20-5.03C Gravel Mulch

Not Used

20-5.03D Decomposed Granite

Not Used

20-5.03E Rock Mulch**20-5.03E(1) General**

Rock mulch must be river rock. River rock is rounded rock excavated from historic river channels.

20-5.03E(2) Materials

Rock must be clean, smooth, obtained from a single source, and must comply with the following gradation requirements:

Gradation Requirements	
Screen size (inches)	Percentage passing
6	100-50
4	0-50

You may use rock with superficial chipping or jagged edges if the rock is placed such that the chipped areas and jagged edges are submerged in the soil.

20-5.03E(3) Construction

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Not Used**20-5.03E(4) Payment****Not Used****20-5.03F–20-5.03J Not Used****20-5.04 WOOD MULCH****20-5.04A General****20-5.04A(1) Summary**

Section 20-5.04 includes specifications for placing wood mulch.

20-5.04A(2) Definitions

Not Used

20-5.04A(3) Submittals

Submit a certificate of compliance for wood mulch.

Submit a 2 cu ft mulch sample with the mulch source shown on the bag. Obtain authorization before delivering the mulch to the job site.

20-5.04A(4) Quality Assurance

Not Used

20-5.04B Materials**20-5.04B(1) General**

Mulch must not contain more than 0.1 percent of deleterious materials such as rocks, glass, plastics, metals, clods, weeds, weed seeds, coarse objects, sticks larger than the specified particle size, salts, paint, petroleum products, pesticides or chemical residues harmful to plant or animal life.

Mulch can be obtained from Arbor Mulch from Grab 'n' Grow Soil Products. Santa Rosa. CA. 707-575-7275 or GWRY Treeincarnation Premium Landscape Mulch. all-wood. screened 2-inch minus. from Green Waste Recycle Yard. Berkeley. CA. 510-527-8733. or approve equal. Mulch must be purchased within 100 miles of the site.

20-5.04B(2) Tree Bark Mulch**Not Used****20-5.04B(3) Wood Chip Mulch**

Wood chip mulch must:

1. Be derived from clean wood
2. Not contain leaves or small twigs
3. Contain at least 95 percent by volume of wood chips with a width and thickness from 1/16 to 3/8 inch and a length from 1/2 to 3 inches

20-5.04B(4) Shredded Bark Mulch**Not Used****20-5.04B(5) Tree Trimming Mulch****Not Used****20-5.04B(6)–20-5.04B(11) Not Used****20-5.04C Construction**

Before placing wood mulch, remove plants and weeds to the ground level.

Maintain the planned flow lines, slope gradients, and contours of the job site. Grade the subgrade to a smooth and uniform surface.

Place mulch after the plants have been planted.

Place mulch in the plant basin at the rate described. Mulch must not come in contact with the plant crown and stem.

Place mulch as shown in areas outside of plant basins to a uniform thickness.

Spread mulch from the outside edge of the plant basin to the adjacent edges of shoulders, paving, retaining walls, dikes, edging, curbs, sidewalks, walls, fences, and existing plantings. If the plant is 12 feet or more from the adjacent edges of any of these elements, spread the mulch 6 feet beyond the outside edge of the plant basin.

Do not place mulch within 4 feet of:

1. Flow line of earthen drainage ditches
2. Edge of paved ditches
3. Drainage flow lines

20-5.04D Payment

The payment quantity for wood mulch is the volume measured in the vehicle at the point of delivery.

20-5.05 SITE FURNISHINGS

Not Used

20-5.06–20-5.10 NOT USED**20-6–20-9 NOT USED****20-10 EXISTING LANDSCAPE****20-10.01 GENERAL****20-10.01A General**

Section 20-10.01 includes general specifications for performing work on existing planting and irrigation facilities.

20-10.01B Materials

Not Used

20-10.01C Construction

Transplant any plant to be transplanted and protect any irrigation component to be relocated before performing any other construction activity in the area.

20-10.01D Payment

Not Used

20-10.02 EXISTING IRRIGATION FACILITIES

Not Used

20-10.03 EXISTING PLANTING**20-10.03A General****20-10.03A(1) Summary**

Section 20-10.03 includes specifications for performing work on existing planted areas.

~~Transplant palm trees between March 15 and October 15.~~

20-10.03A(2) Definitions

Not Used

20-10.03A(3) Submittals

Submit a work plan for:

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1. Transplanting trees. The work plan must include methods of lifting, transporting, storing, planting, guying, watering and maintaining each tree to be transplanted. Include the root ball size, method of root ball containment, and a maintenance program for each tree.
2. Maintaining existing planted areas. The work plan must include controlling the weeds, fertilizing, mowing and trimming of turf areas, watering, and controlling rodents and pests.

Submit a copy of the manufacturer's product sheet for root stimulant including application instructions.

20-10.03A(4) Quality Assurance

Inspect for deficiencies of existing planted areas in the presence of the Engineer. Complete the inspection within 15 days of the start of job site activities.

Deficiencies requiring corrective action include:

1. Weeds
2. Dead, diseased, or unhealthy plants
3. ~~Plant stakes and tree ties that are missing~~
4. Inadequate plant basins and basin mulch
5. Other deficiencies needing corrective action to promote healthy plant life
6. Pests

20-10.03B Materials

Not Used

20-10.03C Construction

20-10.03C(1) General

Correct deficiencies of the existing planted areas if ordered within 15 days of the order. Correction of deficiencies is change order work.

20-10.03C(2) Prune Existing Plants

If a bid item for prune existing plants is not shown on the Bid Item List, prune existing plants under section 20-3.01C(2) if ordered. Pruning existing plants is change order work.

20-10.03C(3) Transplant Trees

Not Used

20-10.03C(4) Maintain Existing Planted Areas

Not Used

20-10.03D Payment

Not Used

20-10.04–20-10.08 NOT USED

DIVISION IV SUBBASES AND BASES

Replace section 23 with:

23 GENERAL

23-1 GENERAL

23-1.01 GENERAL

23-1.01A Summary

Section 23 includes general specifications for constructing subbases and bases.

23-1.01B Definitions

Reserved

23-1.01C Submittals

Submit a QC plan for the types of subbases or bases where described.

23-1.01D Quality Assurance

23-1.01D(1) General

23-1.01D(1)(a) General

Take samples under California Test 125.

23-1.01D(1)(b) Test Result Disputes

You and the Engineer must work together to avoid potential conflicts and to resolve disputes regarding test result discrepancies. Notify the Engineer within 5 business days of receiving the test result if you dispute the test result.

If you or the Engineer dispute each other's test results, submit your test results and copies of paperwork including worksheets used to determine the disputed test results. An independent third party performs referee testing. Before the independent third party participates in a dispute resolution, it must be qualified under AASHTO re:source program and the Caltrans Independent Assurance Program. The independent third party must have no prior direct involvement with this Contract. By mutual agreement, the independent third party is chosen from:

- ~~1. Department laboratory in a district or region not in the district or region the project is located~~
- ~~2. Transportation Laboratory~~
- ~~3. Laboratory not currently employed by you or your material producer~~

If split acceptance samples are not available, the independent third party uses any available material representing the disputed material for evaluation.

If the independent third party determines the Agency's test results are valid, the Engineer deducts the independent third party testing costs from payments. If the independent third party determines your test results are valid, the Agency pays the independent third party testing costs.

23-1.01D(2) Quality Control

23-1.01D(2)(a) General

Provide a QC manager when the quantity of subbase or base is as shown in the following table:

QC Manager Requirements

Subbase or base	Requirement
Stabilized soil (sq yd)	≥ 20,000
Aggregate subbases (cu yd)	≥ 20,000
Aggregate bases (cu yd)	≥ 20,000
CTB (cu yd)	≥ 10,000
Lean concrete base (cu yd)	≥ 2,000
Rapid strength concrete base (cu yd)	≥ 1,000
Lean concrete base rapid setting (cu yd)	≥ 1,000
Concrete base (cu yd)	≥ 1,000
Treated permeable bases (cu yd)	≥ 2,000
Reclaimed pavements (sq yd)	≥ 10,000

Provide a testing laboratory to perform quality control tests. Maintain sampling and testing equipment in proper working condition.

You are not entitled to compensation for the suspension of work resulting from noncompliance with quality control requirements, including those identified within the QC plan.

23-1.01D(2)(b) Quality Control Plan

The QC plan must describe the organization and procedures used to:

1. Control the production process
2. Determine if a change to the production process is needed
3. Implement a change

The QC plan must include action and suspension limits and details of corrective action to be taken if any process is outside of those limits. Suspension limits must not exceed specified acceptance criteria.

The QC plan must describe how test results will be submitted including times for sampling and testing for each quality characteristic.

23-1.01D(2)(c) Qualifications

Testing laboratories and testing equipment must comply with the Department's Independent Assurance Program.

Personnel performing sampling and testing must be qualified under the Department's Independent Assurance Program for the sampling and testing performed.

23-1.01D(3) Agency Acceptance

Reserved

23-1.02 MATERIALS

Not Used

23-1.03 CONSTRUCTION

Not Used

23-1.04 PAYMENT

Not Used

23-2-23-7 RESERVED

Replace section 26 with:

26 AGGREGATE BASES

26-1 GENERAL

26-1.01 GENERAL

26-1.01A Summary

Section 26 includes specifications for placing aggregate base.

26-1.01B Definitions

Reserved

26-1.01C Submittals

Submit an aggregate base QC plan.

26-1.01D Quality Assurance

26-1.01D(1) General

Aggregate samples must not be treated with lime, cement, or chemicals before testing for durability index. Aggregate from untreated reclaimed processed AC, PCC, LCB, or CTB is not considered treated.

26-1.01D(2) Quality Control

26-1.01D(2)(a) General

Reserved

26-1.01D(2)(b) Quality Control Plan

If you propose to use aggregate base reclaimed from onsite or elsewhere that has not been processed through a plant, your QC plan under section 26-1.01C must describe the method and frequency of material sampling that ensures to the satisfaction of the Engineer that the reclaimed material meets operating range requirements and that it has not been contaminated by a mixture of unsuitable material.

26-1.01D(2)(c) Qualifications

Aggregate base that is reclaimed from onsite or elsewhere, but has not been processed, will only be accepted upon you demonstrating through an authorized laboratory certification, that the AB, sampled as described in your approved quality control plan, complies with the operating range requirements.

26-1.01D(2)(d) Quality Control Testing

AB quality control must include testing the quality characteristics at the frequencies shown in the following table:

QC Testing Frequencies

Quality characteristic	Test method	Sampling location	Minimum frequency
R-value	California Test 301	Stockpiles, transportation units, windrows, or roadways	1 test before starting work and every 2,000 cu yd thereafter ^a
Aggregate gradation	California Test 202	Stockpiles, transportation units, windrows, or roadways	1 per 500 cu yd but at least one per day of placement
Sand equivalent	California Test 217	Stockpiles, transportation units, windrows, or roadways	
Durability index ^b	California Test 229	Stockpiles, transportation units, windrows, or roadways	1 per project
Relative compaction	California Test 231	Roadway	1 per 500 sq yd on each layer

^aAdditional R-value frequency testing will not be required when the average of 4 consecutive sand equivalent tests is 29 or greater for Class 2 AB or 25 or greater for Class 3 AB.

^bApplies if section 26-1.02 contains an applicable requirement for durability index

26-1.01D(3) Agency Acceptance

The Agency accepts AB based on aggregate gradation, R-value requirements, durability, and sand equivalent requirements specified in section 26-1.02.

The Agency accepts AB based on percent relative compaction specified in section 26-1.03E tested under California Test 231.

The Engineer takes aggregate base samples for R-value, aggregate gradation, sand equivalent, and durability index from any of the following locations:

1. Windrow
2. Roadway

If the aggregate gradation test results, sand equivalent test results, or both comply with the Contract compliance requirements but not the operating range requirements, you may continue placing AB for the remainder of the work day. Do not place additional AB until you demonstrate to the Engineer the AB to be placed complies with the operating range requirements.

If the aggregate gradation test results, sand equivalent test results, or both do not comply with Contract compliance requirements, remove the AB or request a payment deduction. If your request is authorized, \$2.00/cu yd is deducted. If AB is paid by weight, the Engineer converts tons to cubic yards for the purpose of reducing payment for noncompliant AB left in place.

Each aggregate gradation and a sand equivalent test represents no more than 500 cu yd of AB or 1 day's production, whichever is smaller.

26-1.02 MATERIALS**26-1.02A General**

Aggregate must be clean and consist of any combination of the following:

1. Broken stone
2. Crushed gravel
3. Natural rough-surfaced gravel
4. Sand
5. Processed reclaimed asphalt concrete, PCC, LCB, or CTB

Use either 1-1/2-inch or 3/4-inch maximum aggregate gradation unless otherwise specified. Do not change your selected aggregate gradation without authorization.

26-1.02B Class 2 Aggregate Base

Aggregate gradation must be within the percentage passing limits for the sieve sizes shown in the following table:

Aggregate Gradation

Sieve size	Percentage passing			
	1-1/2 inch maximum		3/4 inch maximum	
	Operating range	Contract compliance	Operating range	Contract compliance
2"	100	100	--	--
1-1/2"	90–100	87–100	--	--
1"	--	--	100	100
3/4"	50–85	45–90	90–100	87–100
No. 4	25–45	20–50	35–60	30–65
No. 30	10–25	6–29	10–30	5–35
No. 200	2–9	0–12	2–9	0–12

The aggregate quality characteristics must comply with the requirements shown in the following table:

Aggregate Quality Characteristics

Quality characteristic	Requirement	
	Operating range	Contract compliance
Resistance (R-value, min)	--	78
Sand equivalent (min)	25	22
Durability index (min)	--	35

26-1.02C Class 3 Aggregate Base

Aggregate gradation must be within the percentage passing limits for the sieve sizes shown in the following table:

Aggregate Gradation

Sieve size	Percentage passing			
	1-1/2 inch maximum		3/4 inch maximum	
	Operating range	Contract compliance	Operating range	Contract compliance
2"	100	100	--	--
1-1/2"	90–100	87–100	--	--
1"	--	--	100	100
3/4"	50–90	45–95	90–100	87–100
No. 4	25–60	20–65	40–70	35–75
No. 30	10–35	6–39	12–40	7–45
No. 200	3–15	0–19	3–15	0–19

The aggregate quality characteristics must comply with the requirements shown in the following table:

Aggregate Quality Characteristic

Quality characteristic	Requirement	
	Operating range	Contract compliance
Resistance (R-value) (min)	--	50
Sand equivalent (min)	21	18

26-1.02D Cushion Material

Cushion material for curbs, sidewalks and their appurtenances must be rock of such quality that, immediately prior to placing, the percentage composition by weight must conform to the following gradation when determined by California Test Method No. 202:

1. 100 percent passing a 2 inch sieve
2. 25 percent maximum passing a No. 200 sieve

The material when tested in accordance with California Test Method No. 217 must have a minimum sand equivalent of 25, and when tested in accordance with California Test Method No. 301, must have a maximum equivalent expansion of 1 inch cover at 300 psi exudation pressure.

26-1.03 CONSTRUCTION**26-1.03A General**

Apply water to the AB as needed for compaction.

26-1.03B Subgrade

Immediately before spreading AB, the subgrade must comply with the specified compaction and elevation tolerance for the material involved and be free from loose or extraneous material.

You may use AB to fill areas of the subgrade that are lower than the grade established by the Engineer.

26-1.03C Placing Geosynthetic Materials

Not Used

26-1.03D Spreading

Deliver uniform mixtures of AB to the roadbed. Deposit AB in layers or windrows. Spread and shape the AB to such thickness that after watering and compacting, the completed AB is within the tolerances specified in section 26-1.03E. When AB is spread and compacted the moisture content must be uniform and sufficient to obtain the required compaction. Avoid material segregation. AB must be free from pockets of coarse or fine material.

If the subgrade is cohesionless sand, you may dump AB in piles and spread it ahead in sufficient quantities to stabilize the subgrade, if authorized.

If the AB thickness shown is 0.50 foot or less, spread and compact the AB in at least 1 layer. If the thickness shown is more than 0.50 foot, spread and compact the AB in at least 2 approximately equal layers in thickness. The compacted thickness of any one layer must not exceed 0.50 foot.

At locations inaccessible to spreading equipment, spread and compact AB by any means that will attain the specified requirements.

26-1.03E Compacting

Compact each AB layer to at least 95 percent relative compaction.

If biaxial geogrid is shown, compact AB with either (1) a smooth-wheeled roller or (2) a rubber-tired roller. Do not use vibratory devices during compaction.

The finished AB surface must not vary more than 0.05 foot from the grade established by the Engineer.

SECTION 26

AGGREGATE BASES

Correct areas of AB that do not comply with the described thickness or request a payment deduction if AB is paid for by volume. If your request is authorized, the Engineer calculates the deduction by multiplying:

1. Deficient thickness less allowable tolerance
2. Planned width
3. Longitudinal distance of the deficient thickness
4. \$17.00/cu yd or the item bid price adjusted for cubic yards, whichever is higher

26-1.04 PAYMENT

If aggregate base is paid for by volume, the payment quantity is determined from the dimensions shown. The payment quantity does not include the volume of aggregate base used to fill low areas of the subgrade.

If the basement material is imported borrow, aggregate base placed to fill low areas is not measured or paid for as imported borrow.

If aggregate base is paid for by weight, the Engineer deducts the weight of the water at the time of weighing in excess of the optimum moisture content plus 1 percent from the weight of the aggregate base. The Engineer determines the optimum moisture content under California Test 216.

26-2-26-10 RESERVED

DIVISION V SURFACINGS AND PAVEMENTS

Replace section 36 with:

36 GENERAL

Not Used

Replace section 39 with:

39 ASPHALT CONCRETE

39-1 GENERAL

39-1.01 GENERAL

Section 39 includes specifications for performing asphalt concrete work.

Section 39 has been amended to include revisions prepared by an HMA-LV Sub-Task Group (STG) and issued by the California Asphalt Pavement Association (CalAPA). It has been further revised by the Agency. The revision marks in this section reflect amendments to the CalAPA specifications.

39-1.02 MATERIALS

Not Used

39-1.03 CONSTRUCTION

Not Used

39-1.04 PAYMENT

Not Used

39-2 HOT MIX ASPHALT

39-2.01 GENERAL

39-2.01A General

39-2.01A(1) Summary

Section 39-2.01 includes general specifications for producing and placing hot mix asphalt.

HMA includes one or more of the following types:

1. Type A HMA (under section 39-2.02)
2. RHMA-G (Rubberized HMA – Gap Graded under section 39-2.03)
3. OGFC (Open Graded Friction Courses – under section 39-2.04)
4. BWC (Bonded Wearing Courses – under section 39-2.05)
5. Minor HMA (under section 39-2.07)
6. HMA-LV (HMA-Low Volume [Type A] under section 39-2.09)

WMA technologies must be on the Authorized Material List for WMA authorized technologies.

For HMA that uses asphalt binder containing crumb rubber modifier, submit a Crumb Rubber Usage Report form monthly and at the end of the project.

SECTION 39**ASPHALT CONCRETE**

Wherever reference is made to the following test methods, the year of publication for these test methods is as shown in the following table:

Test method	Year of publication
AASHTO M 17	2011 (2015)
AASHTO M 323	2013
AASHTO R 30	2002 (2015)
AASHTO R 59	2011 (2015)
AASHTO T 27	2014
AASHTO T 49	2014
AASHTO T 59	2013
AASHTO T 96	2002 (2010)
AASHTO T 164	2014
AASHTO T 176	2008
AASHTO T 209	2012
AASHTO T 269	2014
AASHTO T 275	2007 (2012)
AASHTO T 283	2014
AASHTO T 304	2011
AASHTO T 305	2014
AASHTO T 308	2010
AASHTO T 312	2014
AASHTO T 313	2012 (2016)
AASHTO T 315	2012 (2016)
AASHTO T 324	2014
AASHTO T 329	2013
AASHTO T 335	2009
ASTM D36/D36M	2014 ^{ε1}
ASTM D92	2012b
ASTM D217	2010
ASTM D297	2013
ASTM D445	2014
ASTM D1856	2009 (Reapproved 2015)
ASTM D2007	2011
ASTM D2074	2007 (Reapproved 2013)
ASTM D2995	1999 (Reapproved 2009)
ASTM D4791	2010
ASTM D5329	2009
ASTM D7741/D7741M	2011 ^{ε1}
Asphalt Institute MS-2	7th edition (2015)

39-2.01A(2) Definitions

binder replacement: Binder from RAP expressed as a percent of the total binder in the mix.

coarse aggregate: Aggregate retained on a no. 4 sieve.

fine aggregate: Aggregate passing a no. 4 sieve.

leveling course: Thin layer of HMA used to correct minor variations in the longitudinal and transverse profile of the pavement before placement of other pavement layers.

miscellaneous areas: Areas outside the traveled way and shoulders such as:

1. Median areas not including inside shoulders
2. Island areas
3. Sidewalks

4. Gutters
5. Ditches
6. Overside drains
7. Aprons at ends of drainage structures

~~processed RAP: RAP that has been fractionated.~~

Reclaimed Asphalt Pavement (RAP): Removed and/or processed pavement materials containing asphalt and aggregates.

supplemental fine aggregate: Mineral filler consisting of rock dust, slag dust, hydrated lime, hydraulic cement, or any combination of these and complying with AASHTO M 17.

Warm Mix Asphalt (WMA): HMA produced using a warm mix asphalt technology produced at a temperature from 240 to 325 degrees f.

39-2.01A(3) Submittals

39-2.01A(3)(a) General

Reserved

39-2.01A(3)(b) Job Mix Formula

39-2.01A(3)(b)(i) General

Except for the HMA to be used in miscellaneous areas and dikes, submit your proposed JMF for each type of HMA to be used. Submit JMFs from two separate sources (a primary source and a backup source). The JMF must be submitted ~~on the Contractor Job Mix Formula Proposal form~~ along with:

1. Mix design documentation ~~on a Contractor Hot Mix Asphalt Design Data form~~ dated within 12 months of the submittal for the JMF verification.
- ~~2. JMF verification on a Caltrans Hot Mix Asphalt Verification form and the Contractor Hot Mix Asphalt Design Data form that was submitted for the JMF verification, if applicable.~~
- ~~3. JMF renewal on a Caltrans Job Mix Formula Renewal form, if applicable.~~
24. SDS for:
 - 4.1. Asphalt binder
 - 4.2. Supplemental fine aggregate except fines from dust collectors
 - 4.3. Antistrip additives

~~The Contractor Hot Mix Asphalt Design Data form must identify the AASHTO resource accredited lab responsible for the mix design and show documentation on aggregate quality.~~

~~If you cannot submit a Agency verified JMF on a Caltrans Hot Mix Asphalt Verification form dated within 12 months before HMA production, the Engineer verifies the JMF.~~

Submit a new JMF if you change any of the following:

1. Target asphalt binder percentage greater than ± 0.2 percent
2. Asphalt binder supplier
3. Combined aggregate gradation
4. Aggregate sources
5. Liquid antistrip producer or dosage
6. Average binder content in a new processed RAP stockpile by more than ± 2.00 percent from the average RAP binder content initially reported ~~on page 4 of your Contractor Hot Mix Asphalt Design Data form~~
7. Average maximum specific gravity in a new processed RAP stockpile by more than ± 0.060 from the average maximum specific gravity value initially reported ~~on page 4 of your Contractor Hot Mix Asphalt Design Data form~~
8. Any material in the JMF, except lime supplier and source

Allow the Engineer 5-10 business days from a complete JMF submittal for document review of the aggregate qualities, mix design, and JMF. The Engineer notifies you if the proposed JMF submittal is accepted.

If your JMF fails verification testing, submit an adjusted JMF based on your testing. The adjusted JMF must include ~~a new Contractor Job Mix Formula Proposal form, Contractor Hot Mix Asphalt Design Data form, and~~ the results of the failed verification testing.

You may submit an adjusted aggregate gradation TV ~~on a Contractor Job Mix Formula Proposal form~~ before verification testing. Aggregate gradation TV must be within the TV limits specified.

39-2.01A(3)(b)(ii) Job Mix Formula Renewal

Not Used

39-2.01A(3)(b)(iii) Job Mix Formula Modification

Not Used

39-2.01A(3)(c) Quality Control Plan

At least 5 business days prior to the pre-paving meeting, submit a QC plan for HMA.

The QC plan must describe the organization and procedures for:

1. Controlling HMA quality characteristics
2. Taking samples, including sampling locations
3. Establishing, implementing, and maintaining QC
4. Determining when corrective actions are needed
5. Implementing corrective actions
6. Using methods and materials for backfilling core locations

The QC plan must address the elements affecting HMA quality, including:

1. Aggregates
2. Asphalt binder
3. Additives
4. Production
5. Paving

~~The QC plan must include aggregate QC sampling and testing during lime treatment.~~

Allow 5 10 business days for review of the QC plan.

If you change QC procedures, personnel, or sample testing locations, submit a QC plan supplement before implementing the proposed change. Allow 3 business days for review of the QC plan supplement.

39-2.01A(3)(d) Test Results

If requested by the Engineer, submit all QC test results, except AASHTOT324 (Modified), within 3 business days of production.

If coarse and fine durability index tests are required, submit test results within 2 business days of testing.

~~For mix design, JMF verification, production start up, and each 10,000 tons, submit AASHTO T 283 and AASHTO T 324 (Modified) test results to the Engineer and electronically to:~~

~~Moisture_Tests@dot.ca.gov~~

~~Submit all QC test results, except AASHTO T 283 and AASHTO T 324 (Modified), within 3 business days of a request. Submit AASHTO T 283 QC tests within 15 days of sampling.~~

~~For tests performed under AASHTO T 324 (Modified), submit test data and 1 tested sample set within 5 business days of sampling.~~

~~If coarse and fine durability index tests are required, submit test results within 2 business days of testing.~~

~~If a tapered notched wedge is used, submit compaction test result values within 24 hours of testing.~~

39-2.01A(3)(e) Reserved

39-2.01A(3)(f) Liquid Antistrip Treatment

If liquid antistrip treatment is used, submit the following with your proposed JMF submittal:

1. One 1 pt sample
2. Infrared analysis, including copy of absorption spectra
3. Certified copy of test results
4. Certificate of compliance for each liquid antistrip shipment. On each certificate of compliance, include:
 - 4.1. Your signature and printed name
 - 4.2. Shipment number
 - 4.3. Material type
 - 4.4. Material specific gravity
 - 4.5. Refinery
 - 4.6. Consignee
 - 4.7. Destination
 - 4.8. Quantity
 - 4.9. Contact or purchase order number
 - 4.10. Shipment date
5. Proposed proportions for the liquid antistrip

~~For each delivery of liquid antistrip to the HMA production plant, submit a 1 pt sample to METS. Submit shipping documents. Label each liquid antistrip sampling container with:~~

- ~~1. Liquid antistrip type~~
- ~~2. Application rate~~
- ~~3. Sample date~~
- ~~4. Contract number~~

~~At the end of each day's production shift, submit production data in electronic and printed media. Present data on electronic media in a tab delimited format. Use line feed carriage return with 1 separate record per line for each production data set. Allow enough fields for the specified data. Include data titles at least once per report. For each HMA mixing plant type, submit the following information in the order specified:~~

- ~~1. For batch plant mixing:

 - ~~1.1. Production date~~
 - ~~1.2. Time of batch completion~~
 - ~~1.3. Mix size and type~~
 - ~~1.4. Each ingredient's weight~~
 - ~~1.5. Asphalt binder content as a percentage of the total weight of mix~~
 - ~~1.6. Liquid antistrip content as a percentage of the asphalt binder weight~~~~
- ~~2. For continuous mixing plant:

 - ~~2.1. Production date~~
 - ~~2.2. Data capture time~~
 - ~~2.3. Mix size and type~~
 - ~~2.4. Flow rate of wet aggregate collected directly from the aggregate weigh belt~~
 - ~~2.5. Aggregate moisture content as a percentage of the dry aggregate weight~~
 - ~~2.6. Flow rate of asphalt binder collected from the asphalt binder meter~~
 - ~~2.7. Flow rate of liquid antistrip collected from the liquid antistrip meter~~
 - ~~2.8. Asphalt binder content as a percentage of the total weight of mix calculated from:

 - ~~2.8.1. Aggregate weigh belt output~~
 - ~~2.8.2. Aggregate moisture input~~
 - ~~2.8.3. Asphalt binder meter output~~~~~~

~~2.9. Liquid antistrip content as a percentage of the asphalt binder weight calculated from:~~

~~2.9.1. Asphalt binder motor output~~

~~2.9.2. Liquid antistrip motor output~~

39-2.01A(3)(g) Lime Treatment

Not Used.

39-2.01A(3)(h) Warm Mix Asphalt Technology

If a WMA technology is used, submit the following with your proposed JMF submittal:

1. SDS for the WMA technology
2. For water injection foam technology:
 - 2.1. Name of technology
 - 2.2. Proposed foaming water content
 - 2.3. Proposed HMA production temperature range
 - 2.4. Certification from binder supplier stating no antifoaming agent is used
3. For additive technology:
 - 3.1. Name of technology
 - 3.2. Percent admixture by weight of binder and percent admixture by total weight of HMA as recommended by the manufacturer
 - 3.3. Methodology for inclusion of admixture in laboratory-produced HMA
 - 3.4. Proposed HMA production temperature range

Collect and hold data for the duration of the Contract and submit the electronic media daily. The snapshot of production data must include the following:

1. Production date
2. Production location
3. Time of day the data is captured
4. HMA mix type being produced and target binder rate
5. HMA additive type, brand, and target rate
6. Temperature of the binder and HMA mixture
7. For a continuous mixing plant, the rate of flow of the dry aggregate calculated from the wet aggregate flow rate as determined by the conveyor scale
8. For a continuous mixing plant, the rate of flow of the asphalt meter
9. For a continuous mixing plant, the rate of flow of HMA additive meter
10. For batch plant mixing, actual batch weights of all ingredients
11. Dry aggregate to binder ratio calculated from metered ingredient output
12. Dry aggregate to HMA additive ratio calculated from metered output

At the end of each day's production shift, submit electronic and printed media from the HMA plant process controller. Present data on electronic media in comma-separated values or tab-separated values format. The captured data for the ingredients represented by the production snapshot must have allowances for sufficient fields to satisfy the amount of data required by these specifications and include data titles at least once per report.

39-2.01A(3)(i) Samples

At the request of the Engineer, the Contractor shall provide samples for Production Start-up evaluation. Submit 2 parts to the Engineer and use 2 parts for your testing.

39-2.01A(3)(j) Tack Coat

Prior to applying tack coat, submit calculations for the minimum spray rate required to achieve the minimum residual rate.

39-2.01A(3)(k) Reserved

39-2.01A(3)(l) Data Cores

Not Used

39-2.01A(3)(m)–39-2.01A(3)(o) Reserved

39-2.01A(4) Quality Assurance

39-2.01A(4)(a) General

Not Used.

~~If a WMA technology is used, a technical representative for the WMA technology must attend the preconstruction meeting.~~

39-2.01A(4)(b) Job Mix Formula Verification

Not Used

39-2.01A(4)(c) Job Mix Formula Authorization

You may start HMA production if:

1. Engineer's review of the JMF shows compliance with the specifications
2. Your QC plan has been reviewed and approved. Agency has verified the JMF within 12 months before HMA production
3. ~~Engineer authorizes the verified JMF~~

39-2.01A(4)(d) Job Mix Formula Renewal

Not Used

39-2.01A(4)(e) Job Mix Formula Modification

Not Used

39-2.01A(4)(f) Certifications

39-2.01A(4)(f)(i) General

Laboratories testing aggregate and HMA qualities used to prepare the mix design and JMF must be qualified under AASHTO re:source program and the Caltrans Independent Assurance Program or be approved by the Engineer.

39-2.01A(4)(f)(ii) Hot Mix Asphalt Plants

Before production, the HMA plant must have a current qualification under the Caltrans Material Plant Quality Program or be approved by the Engineer.

39-2.01A(4)(f)(iii)–39-2.01A(4)(f)(v) Reserved

39-2.01A(4)(g) Reserved

39-2.01A(4)(h) Quality Control

39-2.01A(4)(h)(i) General

QC test results must comply with the specifications for Agency acceptance.

Condition each at-the-plant sample of HMA mixture ~~for AASHTO 324 and AASHTO 283~~ in compliance with sections 7.1.2, 7.1.3, and 7.1.4 of AASHTO R 30. Condition each at-the-plant sample of HMA mixture when composite aggregate absorption factor is greater than 2.0 percent as indicated by the JMF in compliance with sections 7.1.2, 7.1.3, and 7.1.4 of AASHTO R 30.

~~Prepare 3 briquettes for air voids content and voids in mineral aggregate determination. Report the average of 3 tests.~~

Prepare a minimum of 2 briquettes for air void content and voids in mineral aggregate determination. Report the average of a minimum of 2 tests. Except for smoothness, if 2 consecutive QC test results or any 3 QC test results for 1 day's production do not comply with the materials specifications:

1. Stop HMA production
2. Notify the Engineer
3. Take corrective action
4. Demonstrate compliance with the specifications before resuming production and placement

For QC tests performed under AASHTO T 27, results are considered 1 QC test regardless of number of sieves out of compliance.

Do not resume production and placement until the Engineer authorizes your corrective action proposal.

39-2.01A(4)(h)(ii) Reserved

39-2.01A(4)(h)(iii) Aggregates

39-2.01A(4)(h)(iii)(A) General

Reserved

39-2.01A(4)(h)(iii)(B) Aggregate Lime Treatments

Not Used.

39-2.01A(4)(h)(iv) Liquid Antistrip Treatment

For continuous mixing or batch-plant mixing, sample asphalt binder before adding liquid antistrip. ~~For continuous mixing, sample the combined asphalt binder and liquid antistrip after the static mixer.~~

39-2.01A(4)(h)(v) Production Start-up Evaluation

You and the Engineer evaluate HMA production and placement at production start-up.

Within the first 750 tons produced on the 1st day of HMA production, in the Engineer's presence, and from the same production run, take samples of:

1. Aggregates
2. Asphalt binder
3. RAP
4. HMA

Sample aggregates from the combined cold-feed belt or hot bin. Take RAP samples from the RAP system.

For aggregates, RAP, and HMA, split the samples into at least 4 parts and label their containers. ~~Submit 3 parts and keep 1 part. Submit 2 parts to the Engineer and keep 2 parts. You and the Engineer must retain 1 part in the event of dispute resolution.~~

You and the Engineer must test the sample and report test results within 5 business days of sampling if required. ,except for AASHTO T 324 (Modified). For ASSHTO T 324 (Modified) report test results within 15 days of sampling. If you proceed before receipt of the test results, the Engineer may consider the HMA placed to be represented by these test results.

~~You and the Engineer must test the samples and report test results, except for AASHTO T 324 (Modified) and AASHTO T 283 test results, within 5 business days of sampling. For AASHTO T 324 (Modified) and AASHTO T 283 test results, report test results within 15 days of sampling. If you proceed before receipt of the test results, the Engineer may consider the HMA placed to be represented by these test results.~~

~~Take one 4 or 6 inch diameter density core for each 250 tons or portion thereof of HMA placed. For each density core, the Engineer reports the bulk specific gravity determined under AASHTO T 275, Method A, in addition to the percent of theoretical maximum density.~~

39-2.01A(4)(h)(vi) Hot Mix Asphalt Density

~~During HMA placement determine HMA density using a nuclear gauge. On the 1st day of production, develop a correlation factor between cores and nuclear density gauge under California Test 375~~

~~Test for in-place density using cores and a nuclear gauge Test at random locations you select and include the test results in your QC production tests reports.~~

During HMA placement determine HMA density using a nuclear density gage under California Test 375.

Test at random locations you select and include the test results in your QC production test reports. Lots for density testing must not exceed 275 tons.

39-2.01A(4)(h)(vii) Tapered Notched Wedge

Not Used

39-2.01A(4)(h)(viii) Density Cores

Not Used

39-2.01A(4)(h)(ix) Reserved

39-2.01A(4)(i) Agency Acceptance

39-2.01A(4)(i)(i) General

~~The Agency tests treated aggregate for acceptance before lime treatment except for gradation.~~

~~The Engineer takes HMA samples for AASHTO T 283 and AASHTO T 324 (Modified) from any of the following locations:~~

- ~~1. Plant~~
- ~~2. Truck~~
- ~~3. Windrow~~

The Engineer takes HMA samples for all other tests from any of the following locations:

1. Plant
2. Truck
3. Windrow
4. Mat behind the paver

You must assist in collecting Engineer acceptance samples. Sample in the presence of the Engineer. Split the Engineer acceptance samples into at least 4 parts. Engineer retains 3 parts and you keep 1 part.

To obtain workability of the HMA sample for splitting, the Engineer reheats each sample of HMA mixture not more than 2 cycles. Each reheat cycle is performed by placing the loose mixture in a mechanical forced-draft oven for 2 hours or less after the sample reaches 140 degrees F.

The Engineer conditions each at-the-plant sample of HMA mixture ~~for AASHTO 324 and AASHTO 283~~ in compliance with sections 7.1.2, 7.1.3, and 7.1.4 of AASHTO R 30. ~~The Engineer conditions each at the plant sample of HMA mixture when composite aggregate absorption factor is greater than 2.0 percent as indicated by the JMF in compliance with sections 7.1.2, 7.1.3, and 7.1.4 of AASHTO R 30.~~

No single aggregate or HMA test result may represent more than ~~750~~ 275 tons or one day's production, whichever is less ~~except AASHTO T 283 and AASHTO T 324 (Modified).~~

Except for smoothness, if 2 consecutive Agency acceptance test results or any 3 Agency acceptance test results for 1 day's production do not comply with the specifications:

1. Stop HMA production
2. Take corrective action
3. Demonstrate compliance with the specifications before resuming production and placement

For Agency acceptance tests performed under AASHTO T 27, results are considered 1 Agency acceptance test regardless of the number of sieves out of compliance.

The Engineer accepts HMA based on:

1. JMF compliance, applicable material tolerances
2. density (if required)
3. smoothness and visual inspection
- ~~4. Authorized JMF~~

- ~~2. Authorized QC plan~~
- ~~3. Asphalt binder compliance~~
- ~~4. Asphalt emulsion compliance~~
- ~~5. Visual inspection~~
- ~~6. Pavement smoothness~~

39-2.01A(4)(i)(ii) In-Place Density

~~Except for HMA pavement placed using method compaction, the Engineer tests the density core you take from each 250 tons of HMA. The Engineer determines the percent of theoretical maximum density for each density core by determining the density core's density and dividing by the theoretical maximum density.~~

Except for HMA pavement placed using method compaction, nuclear density gages will be used to determine the acceptability of HMA density.

Each lift of HMA is tested independently

~~Density cores must be taken from the final layer, cored through the entire pavement thickness shown.~~ Where OGFC is required, take the density cores before placing OGFC.

If the ~~percent of theoretical maximum density~~ relative compaction does not comply with the specifications, the Engineer ~~must~~ may accept the HMA and take a payment deduction as shown in the following table:

Reduced Payment Factors for ~~Relative Compaction Percent of Maximum Theoretical Density~~

~~HMA percent of maximum theoretical density~~ <u>Relative Compaction (%)</u>	Reduced payment factor	~~HMA percent of maximum theoretical density~~ <u>Relative Compaction (%)</u>	Reduced payment factor
~~91.0~~ <u>95.0</u>	0.0000	97.0	0.0000
~~90.9~~ <u>94.9</u>	0.0125	97.1	0.0125
~~90.8~~ <u>94.8</u>	0.0250	97.2	0.0250
~~90.7~~ <u>94.7</u>	0.0375	97.3	0.0375
~~90.6~~ <u>94.6</u>	0.0500	97.4	0.0500
~~90.5~~ <u>94.5</u>	0.0625	97.5	0.0625
~~90.4~~ <u>94.4</u>	0.0750	97.6	0.0750
~~90.3~~ <u>94.3</u>	0.0875	97.7	0.0875
~~90.2~~ <u>94.2</u>	0.1000	97.8	0.1000
~~90.1~~ <u>94.1</u>	0.1125	97.9	0.1125
~~90.0~~ <u>94.0</u>	0.1250	98.0	0.1250
~~89.9~~ <u>93.9</u>	0.1375	98.1	0.1375
~~89.8~~ <u>93.8</u>	0.1500	98.2	0.1500
~~89.7~~ <u>93.7</u>	0.1625	98.3	0.1625
~~89.6~~ <u>93.6</u>	0.1750	98.4	0.1750
~~89.5~~ <u>93.5</u>	0.1875	98.5	0.1875
~~89.4~~ <u>93.4</u>	0.2000	98.6	0.2000
~~89.3~~ <u>93.3</u>	0.2125	98.7	0.2125
~~89.2~~ <u>93.2</u>	0.2250	98.8	0.2250
~~89.1~~ <u>93.1</u>	0.2375	98.9	0.2375
~~89.0~~ <u>93.0</u>	0.2500	99.0	0.2500
~~<89.0~~ <u><93.0</u>	Remove and replace	>99.0	Remove and replace

~~For acceptance of a completed tapered notched wedge joint, the Engineer determines density from cores you take every 3,000 feet.~~

39-2.01A(4)(i)(iii) Pavement Smoothness**39-2.01A(4)(i)(iii)(A) General**

For Level I mix designs, the method for determining acceptable pavement smoothness is by using a straightedge alone.

39-2.01A(4)(i)(iii)(B) Straightedge

The HMA pavement top layer must not vary from the lower edge of a 12-foot long straightedge:

1. More than 0.01 foot when the straight edge is laid parallel with the centerline
2. More than 0.02 foot when the straightedge is laid perpendicular to the centerline and extends from edge to edge of a traffic lane
3. More than 0.02 foot when the straightedge is laid within 24 feet of a pavement conform

39-2.01A(4)(i)(iii)(C) Profilograph

Not Used

39-2.01A(4)(i)(iv) Dispute Resolution

You and the Engineer must work together to avoid potential conflicts and to resolve disputes regarding test result discrepancies. You and the Engineer may only dispute each other's test results if one party's test results pass and the other party's test results fail.

If there is a dispute, submit your test results and copies of paperwork including worksheets used to determine the disputed test results within 3 business days of receiving the Engineer's test results. An independent third party performs referee testing. Before the third party participates in a dispute resolution, it must be qualified under AASHTO resource program, and the Caltrans Independent Assurance Program. The independent third party must have no prior direct involvement with this Contract. The independent third party is chosen by mutual agreement. ~~By mutual agreement, the independent third party is chosen from:~~

- ~~1. Department laboratory in a district or region not in the district or region the project is located~~
- ~~2. Transportation Laboratory~~
- ~~3. Laboratory not currently employed by you or your HMA producer~~

If the Engineer's portion of the split acceptance samples are not available, the independent third party uses any available material representing the disputed HMA for evaluation.

For a dispute involving density, the independent third party performs referee testing based on cores. ~~JMF verification, the independent third party performs referee testing as specified in the 5th paragraph of section 39-2.01A(4)(b).~~

If the independent third party determines the Agency's test results are valid, the Engineer deducts the independent third party's testing costs from payments. If the independent third party determines your test results are valid, the Agency pays the independent third party's testing costs.

39-2.01B Materials**39-2.01B(1) General**

Reserved

39-2.01B(2) Mix Design**39-2.01B(2)(a) General**

The HMA mix design must comply with the superpave HMA mix design as described in *MS-2 Asphalt Mix Design Methods* by the Asphalt Institute.

The Contractor ~~Hot Mix Asphalt Design Data form~~ must show documentation on aggregate quality.

39-2.01B(2)(b) Hot Mix Asphalt Treatments

~~If the proposed JMF indicates that the aggregate is being treated with dry lime or lime slurry with marination, or the HMA with liquid antistripping, then testing the untreated aggregate under AASHTO T 283 and AASHTO T 324 is not required.~~

If HMA treatment is required or being used by the Contractor, determine the plasticity index of the aggregate blend under California Test 204.

Do not use an aggregate blend with a plasticity index greater than 10.

~~If the plasticity index is from 4 to 10, treat the aggregate blend with dry lime with marination or lime slurry with marination.~~

~~If the plasticity index is less than 4, treat the aggregate blend with dry lime or lime slurry with marination, or treat the HMA with liquid antistripping.~~

39-2.01B(2)(c) Warm Mix Asphalt Technology

For HMA with WMA additive technology, produce HMA mix samples for your mix design using your methodology for inclusion of WMA admixture in laboratory-produced HMA. Cure the samples in a forced-air draft oven at 275 degrees F for 4 hours ± 10 minutes.

For WMA water injection foam technology, the use of foamed asphalt for mix design is not required.

39-2.01B(3) Asphalt Binder

Asphalt binder must comply with section 92.

For a leveling course, the grade of asphalt binder for the HMA must be PG 64-10 ~~or PG 64-16~~.

39-2.01B(4) Aggregates**39-2.01B(4)(a) General**

Aggregates must be clean and free from deleterious substances.

The aggregates for a leveling course must comply with the gradation specifications for Type A HMA in section 39-2.02B.

39-2.01B(4)(b) Aggregate Gradations

Aggregate gradation must be determined before the addition of asphalt binder and must include supplemental fine aggregates. Test for aggregate gradation under AASHTO T 27. Do not wash the coarse aggregate. Wash the fine aggregate only. Use a mechanical sieve shaker. Aggregate shaking time must not exceed 10 minutes for each coarse and fine aggregate portion.

Choose a TV within the TV limits shown in the tables titled "Aggregate Gradations."

Gradations are based on nominal maximum aggregate size.

39-2.01B(4)(c) Aggregate Lime Treatments

Not Used.

39-2.01B(5) Liquid Antistripping Treatment

Liquid antistripping must be from 0.25 to 1.0 percent by weight of asphalt binder. Do not use liquid antistripping as a substitute for asphalt binder.

Liquid antistripping total amine value must be 325 minimum when tested under ASTM D2074.

Use only 1 liquid antistripping type or brand at a time. Do not mix liquid antistripping types or brands.

Store and mix liquid antistripping under the manufacturer's instructions.

39-2.01B(6)–39-2.01B(7) Reserved**39-2.01B(8) Hot Mix Asphalt Production****39-2.01B(8)(a) General**

Do not start HMA production before verification and authorization of JMF.

The HMA plant must have a current qualification under the Caltrans Material Plant Quality Program or be approved by the Engineer.

~~Weighing and metering devices used for the production of HMA modified with additives must comply with the Caltrans MPQP. If a loss in weight meter is used for dry HMA additive, the meter must have an automatic and integral material delivery control system for the refill cycle.~~

~~Calibrate the loss in weight meter by:~~

- ~~1. Including at least 1 complete system refill cycle during each calibration test run~~
- ~~2. Operating the device in a normal run mode for 10 minutes immediately before starting the calibration process~~
- ~~3. Isolating the scale system within the loss in weight feeder from surrounding vibration~~
- ~~4. Checking the scale system within the loss in weight feeder for accuracy before and after the calibration process and daily during mix production~~
- ~~5. Using a minimum 15 minute or minimum 250 lb test run size for a dry ingredient delivery rate of less than 1 ton per hour.~~
- ~~6. Complying with the limits of Table B, "Conveyor Scale Testing Extremes," in the Caltrans MPQP~~

Proportion aggregate by hot or cold-feed control.

~~Aggregate temperature must not be more than 375 degrees F when mixed with the asphalt binder.~~

Asphalt binder temperature must be from 275 to 375 degrees F when mixed with aggregate.

Mix HMA ingredients into a homogeneous mixture of coated aggregates.

HMA must be produced at the temperatures shown in the following table:

HMA Production Temperatures	
HMA compaction	Temperature (°F)
HMA	
Density based	≤ 325
Method	305–325
HMA with WMA technology	
Density based	240–325
Method	260–325

If you stop production for longer than 30 days, a production start-up evaluation is required.

39-2.01B(8)(b) Liquid Antistrip

Not Used

39-2.01B(8)(c) Warm Mix Asphalt Technology

Proportion all ingredients by weight. The HMA plant process controller must be the sole source of ingredient proportioning control and be fully interfaced with all scales and meters used in the production process. The addition of the HMA additive must be controlled by the plant process controller.

Liquid ingredient additive, including a normally dry ingredient made liquid, must be proportioned with a mass flow meter at continuous mixing plants. Use a mass flow meter or a container scale to proportion liquid additives at batch mixing plants.

Continuous mixing plants using HMA additives must comply with the following:

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~~1. Dry ingredient additives for continuous production must be proportioned with a conveyor scale or a loss-in-weight meter.~~

- ~~12.~~ HMA plant process controller and ingredient measuring systems must be capable of varying all ingredient-feed rates proportionate with the dry aggregate delivery at all production rates and rate changes.
- ~~23.~~ Liquid HMA additive must enter the production stream with the binder. Dry HMA additive must enter the production stream at or before the mixing area.
- ~~34.~~ If dry HMA additives are used at continuous mixing HMA plants, bag-house dust systems must return all captured material to the mix. This requirement is waived for lime-treated aggregates.
- ~~45.~~ HMA additive must be proportioned to within ± 0.3 percent of the target additive rate.

Batch mixing plants using HMA additives must comply with the following:

1. Metered HMA additive must be placed in an intermediate holding vessel before being added to the stream of asphalt binder as it enters the pugmill.
2. If a container scale is used, weigh additive before combining with asphalt binder. Keep the container scale separate from other ingredient proportioning. The container scale capacity must be no more than twice the volume of the maximum additive batch size. The container scale's graduations must be smaller than the proportioning tolerance or 0.001 times the container scale capacity.
3. Dry HMA additive proportioning devices must be separate from metering devices for the aggregates and asphalt binder. Proportion dry HMA additive directly into the pugmill, or place in an intermediate holding vessel to be added to the pugmill at the appropriate time in the batch cycle. Dry ingredients for batch production must be proportioned with a hopper scale.
4. Zero tolerance for the HMA additive batch scale is ± 0.5 percent of the target additive weight. The indicated HMA additive batch scale weight may vary from the preselected weight setting by up to ± 1.0 percent of the target additive weight.

39-2.01B(9) Geosynthetic Pavement Interlayer

Not Used

39-2.01B(10) Tack Coat

Tack coat must comply with the specifications for asphaltic emulsion or asphalt binder. Choose the type and grade of emulsion or binder.

39-2.01B(11) Miscellaneous Areas and Dikes

Not Used

39-2.01B(12) AC Plug / Pavement Tie In

Use HMA-LV.

39-2.01B(13) AC Driveway Conforms

Not Used

39-2.01B(14) Speed Humps, Road Humps, and Speed Tables

For speed humps, road humps, and speed tables use steam refined HMA-LV, Grade PG-10. Use 1/2-inch maximum size aggregate, medium grading.

The amount of asphalt binder to be mixed with the aggregate must be between four and six percent by weight of the dry aggregate. The exact amount of asphalt binder to be mixed with the aggregate will be determined by the Engineer.

39-2.01C Construction

39-2.01C(1) General

Do not place HMA on wet pavement or frozen surface.

You may deposit HMA in a windrow and load it in the paver if:

1. Paver is equipped with a hopper that automatically feeds the screed

2. Loading equipment can pick up the windrowed material and deposit it in the paver hopper without damaging base material
3. Activities for depositing, pickup, loading, and paving are continuous
4. For method compaction:
 - 4.1. The temperature of the HMA and the HMA produced with WMA water injection technology in the windrow does not fall below 260 degrees F
 - 4.2. The temperature of the HMA produced using WMA additive technology in the windrow does not fall below 250 degrees F

HMA placed in a windrow on the roadway surface must not extend more than 250 feet in front of the loading equipment or material transfer vehicle.

You may place HMA in 1 or more layers on areas less than 5 feet wide and outside the traveled way, including shoulders. You may use mechanical equipment other than a paver for these areas. The equipment must produce uniform smoothness and texture.

HMA handled, spread, or windrowed must not stain the finished surface of any improvement, including pavement.

Do not use petroleum products such as kerosene or diesel fuel to release HMA from trucks, spreaders, or compactors.

HMA must be free of:

1. Segregation
2. Coarse or fine aggregate pockets
3. Hardened lumps
4. Marks
5. Tearing
6. Irregular texture

Complete finish rolling activities before the pavement surface temperature is:

1. Below 150 degrees F for HMA with unmodified binder
2. Below 140 degrees F for HMA with modified binder

39-2.01C(2) Spreading and Compacting Equipment

39-2.01C(2)(a) General

Place HMA only when the atmospheric temperature is above 50 degrees F.

Spread and Compact HMA in the number of layers of the thicknesses indicated in the following table.

Total Thickness Shown on Plans ^a	No. of Layers	Top Layer Thickness (foot)		Next Lower Layer Thickness (foot)		All Other Lower Layer Thickness (foot)	
		Min.	Max.	Min.	Max.	Min.	Max.
0.20-foot or less	1	-	-	-	-	-	-
0.25-foot	2 ^b	0.12	0.13	0.12	0.13	-	-
0.30- 0.40 foot	2	0.15	0.20	0.15	0.25	-	-
0.45-foot or more	c	0.15	0.20	0.15	0.25	0.15	0.40

^a When pavement reinforcing fabric is shown to be placed between layers of HMA, the thickness of HMA above the pavement reinforcing fabric shall be considered to be the "Total Thickness Shown on Plans" for the purpose of spreading and compacting the HMA above the pavement reinforcing fabric.

^b At your option, you may place one layer 0.25-foot thick

^c Place at least two layers if total thickness is 0.45-foot. Place at least three layers if total thickness is more than 0.45-foot and less than 0.90-foot. Place at least 4 layers if total thickness is 0.90-foot or more.

Do not place a layer over a layer which exceeds 0.25 foot in compacted thickness until the temperature of the layer which exceeds 0.25 foot in compacted thickness is less than 160 degrees F at mid depth.

Paving equipment for spreading must be:

1. Self-propelled
2. Mechanical
3. Equipped with a screed or strike-off assembly that can distribute HMA the full width of a traffic lane
4. Equipped with a full-width compacting device
- ~~5. Equipped with automatic screed controls and sensing devices that control the thickness, longitudinal grade, and transverse screed slope~~

~~Install and maintain grade and slope references.~~

The screed must be heated and produce a uniform HMA surface texture without tearing, shoving, or gouging.

The paver must not leave marks such as ridges and indentations unless you can eliminate them by rolling.

Rollers must be equipped with a system that prevents HMA from sticking to the wheels. You may use a parting agent that does not damage the HMA or impede the bonding of layers.

In areas inaccessible to spreading and compacting equipment:

1. Spread the HMA by any means to obtain the specified lines, grades, and cross sections
2. Use a pneumatic tamper, plate compactor, or equivalent to achieve thorough compaction

39-2.01C(2)(b) Material Transfer Vehicle

If a material transfer vehicle is specified, the material transfer vehicle must have sufficient capacity to prevent stopping the paver and must be capable of:

1. Either receiving HMA directly from trucks or using a windrow pickup head to load it from a windrow deposited on the roadway surface
2. Remixing the HMA with augers before transferring into the paver's receiving hopper or feed system
3. Transferring HMA directly into the paver's receiving hopper or feed system

39-2.01C(2)(c) Method Compaction Equipment

For method compaction, each paver spreading HMA must be followed by at least one of each of the following 3 types of rollers:

1. Breakdown roller must be a vibratory roller specifically designed to compact HMA. The roller must be capable of at least 2,500 vibrations per minute and must be equipped with amplitude and frequency controls. The roller's gross static weight must be at least 7.5 tons.
2. Intermediate roller must be an oscillating-type pneumatic-tired roller at least 4 feet wide. Pneumatic tires must be of equal size, diameter, type, and ply. The tires must be inflated to 60 psi minimum and maintained so that the air pressure does not vary more than 5 psi.
3. Finishing roller must be a steel-tired, 2-axle tandem roller. The roller's gross static weight must be at least 7.5 tons.

Each roller must have a separate operator. Rollers must be self-propelled and reversible. Any deviation from the above requirements must be approved in writing by the Engineer.

39-2.01C(2)(d)–39-2.01C(2)(f) Reserved**39-2.01C(3) Surface Preparation****39-2.01C(3)(a) General**

Before placing HMA, remove loose paving particles, dirt, and other extraneous material by any means including flushing and sweeping.

39-2.01C(3)(b) Subgrade

Prepare subgrade to receive HMA under the sections for the material involved. Subgrade must be free of loose and extraneous material.

39-2.01C(3)(c) Reserved**39-2.01C(3)(d) Prepaving Inertial Profiler**

Section 39-2.01C(3)(d) applies to existing asphalt concrete surfaces receiving an HMA overlay if a bid item for prepaving inertial profiler is shown on the Bid Item List.

Before starting paving activities, perform prepaving inertial profiler measurements. Prepaving inertial profiler work includes taking profiles of the existing pavement and analyzing the data with ProVAL to determine existing pavement International Roughness Index, Mean Roughness Index, and areas of localized roughness.

If the Contract includes cold planing, take prepaving inertial profiler measurements before cold planing.

If the Contract includes replace asphalt concrete surfacing, take prepaving inertial profiler measurements after replacing the asphalt concrete surfacing.

39-2.01C(3)(e) Prepaving Grinding

Section 39-2.01C(3)(e) applies to existing asphalt concrete surfaces:

1. That will not be cold planned or milled
2. That will receive an HMA overlay less than or equal to 0.25 foot exclusive of OGFC
3. If a bid item for prepaving grinding day is shown on the Bid Item List

After performing prepaving inertial profiling, correct areas of localized roughness greater than 180 in/mi.

Notify the Engineer of those areas of localized roughness that cannot be corrected by prepaving grinding according to the ProVAL smoothness assurance analysis grinding report. The Engineer responds to your notification within 5 business days.

For those areas of localized roughness that cannot be corrected by grinding, the Engineer may order you to either (1) not correct the areas of localized roughness or (2) correct areas of localized roughness by a different method and take profiles of the corrected areas with an inertial profiler. Corrective work performed by a different method, taking profiles of the corrected areas, the associated traffic control is change order work.

If ordered not to correct areas of localized roughness, the smoothness specifications do not apply to the final pavement surface placed in those areas.

After correcting areas of localized roughness, take profiles of the corrected area and submit profile data as specified in section 36-3.01C(3).

Dispose of grinding residue.

Pave within 7 days of correcting areas.

The final pavement surface must comply with section 39-2.01A(4)(i)(iii).

If the Engineer determines more time is required for prepaving grinding than the Contract allows for and if prepaving grinding is a controlling activity, the Engineer makes a time adjustment.

39-2.01C(3)(f) Tack Coat

Apply a tack coat:

1. To existing pavement including planed surfaces
2. Between HMA layers
3. To vertical surfaces of:
 - 3.1. Curbs
 - 3.2. Gutters
 - 3.3. Construction joints

Equipment for the application of tack coat must comply with section 37-1.03B.

Before placing HMA, apply a tack coat in 1 application at the minimum residual rate shown in the following table for the condition of the underlying surface:

Tack Coat Application Rates for HMA

HMA over:	Minimum residual rates (gal/sq yd)		
	CSS1/CSS1h, SS1/SS1h and QS1h/CQS1h asphaltic emulsion	CRS1/CRS2, RS1/RS2 and QS1/CQS1 asphaltic emulsion	Asphalt binder and PMRS2/PMCRS2 and PMRS2h/PMCRS2h asphaltic emulsion
New HMA (between layers)	0.02	0.03	0.02
Concrete pavement and existing asphalt concrete surfacing	0.03	0.04	0.03
Planed pavement	0.05	0.06	0.04

If a stress absorbing membrane interlayer as specified in section 37-2.05 is applied, the tack coat application rates for new HMA apply.

Notify the Engineer if you dilute asphaltic emulsion with water. The weight ratio of added water to asphaltic emulsion must not exceed 1 to 1.

Measure added water either by weight or volume under section 9-1.02 or use water meters from water districts, cities, or counties. If you measure water by volume, apply a conversion factor to determine the correct weight.

With each dilution, submit:

1. Weight ratio of water to bituminous material in the original asphaltic emulsion
2. Weight of asphaltic emulsion before diluting
3. Weight of added water
4. Final dilution weight ratio of water to asphaltic emulsion

Apply a tack coat to vertical surfaces with a residual rate that will thoroughly coat the vertical face without running off.

If authorized, you may:

1. Change tack coat rates
2. Omit tack coat between layers of new HMA during the same work shift if:
 - 2.1. No dust, dirt, or extraneous material is present
 - 2.2. Surface is at least 140 degrees F

Immediately in advance of placing HMA, apply additional tack coat to damaged areas or where loose or extraneous material is removed.

Close areas receiving tack coat to traffic. Do not allow the tracking of tack coat onto pavement surfaces beyond the job site.

If you use an asphalt binder for tack coat, the asphalt binder temperature must be from 285 to 350 degrees F when applied.

39-2.01C(3)(g) Geosynthetic Pavement Interlayer

Where shown, place geosynthetic pavement interlayer over a coat of asphalt binder and in compliance with the manufacturer's instructions. Do not place the interlayer on a wet or frozen surface. If the interlayer, in compliance with the manufacturer's instructions, does not require asphalt binder, do not apply asphalt binder before placing the interlayer.

Before placing the interlayer or asphalt binder:

1. Repair cracks 1/4 inch and wider, spalls, and holes in the pavement. This repair is change order work.
2. Clean the pavement of loose and extraneous material.

If the interlayer requires asphalt binder, immediately before placing the interlayer, apply asphalt binder at a rate specified by the interlayer manufacturer; at 0.25 ± 0.03 gal per square yard of interlayer; or at a rate that just saturates the interlayer; whichever is greater. Apply asphalt binder the width of the interlayer plus 3 inches on each side. At an interlayer overlap, apply asphalt binder on the lower interlayer the same overlap distance as the upper interlayer.

If asphalt binder tracked onto the interlayer or brought to the surface by construction equipment causes interlayer displacement, cover it with a small quantity of HMA.

If the interlayer placement does not require asphalt binder, apply tack coat prior to placing HMA at the application rates specified under section 39-2.01C(3)(f) based on the condition of the underlying surface on which the interlayer was placed.

Align and place the interlayer with no overlapping wrinkles, except a wrinkle that overlaps may remain if it is less than 1/2 inch thick. If the overlapping wrinkle is more than 1/2 inch thick, cut the wrinkle out and overlap the interlayer no more than 2 inches.

Overlap the interlayer borders between 2 to 4 inches. In the direction of paving, overlap the following roll with the preceding roll at any break.

You may use rolling equipment to correct distortions or wrinkles in the interlayer.

Before placing HMA on the interlayer, do not expose the interlayer to:

1. Traffic, except for crossings under traffic control and only after you place a small HMA quantity
2. Sharp turns from construction equipment
3. Damaging elements

Pave HMA on the interlayer during the same work shift. The minimum HMA thickness over the interlayer must be 0.12 foot including at conform tapers.

39-2.01C(4) Longitudinal Joints

39-2.01C(4)(a) General

Longitudinal joints in the top layer must match lane lines. Alternate the longitudinal joint offsets in the lower layers at least 0.5 foot from each side of the lane line. Other longitudinal joint placement patterns are allowed if authorized.

A vertical longitudinal joint of more than 0.15 foot is not allowed at any time between adjacent lanes open to traffic.

For an HMA thickness of 0.15 foot or less, the distance between the ends of the adjacent surfaced lanes at the end of each day's work must not be greater than can be completed in the following day of normal paving.

For an HMA thickness greater than 0.15 foot, you must place HMA on adjacent traveled way lanes or shoulder such that at the end of each work shift the distance between the ends of HMA layers on adjacent lanes is from 5 to 10 feet. Place additional HMA along the transverse edge at each lane's end and along the exposed longitudinal edges between adjacent lanes. Hand rake and compact the additional HMA to form temporary conforms. You may place kraft paper or other authorized release agent under the conform tapers to facilitate the taper removal when paving activities resume.

If placing HMA against the edge of existing pavement, saw cut or grind the pavement straight and vertical along the joint and remove extraneous material.

39-2.01C(4)(b) Tapered Notched Wedge

For divided highways with an HMA lift thickness greater than 0.15 foot, you may construct a 1-foot wide tapered notched wedge joint as a longitudinal joint between adjacent lanes open to traffic. A vertical notch of 0.75 inch maximum must be placed at the top and bottom of the tapered wedge.

The tapered notched wedge must keep its shape while exposed to traffic. Pave the adjacent lane within 1 day.

Construct the tapered portion of the tapered notched wedge with an authorized strike-off device. The strike-off device must provide a uniform slope and must not restrict the main screed of the paver.

You may use a device attached to the screed to construct longitudinal joints that will form a tapered notched wedge in a single pass. The tapered notched wedge must be compacted to a minimum of 91 percent compaction.

39-2.01C(5) Pavement Edge Treatments

Construct edge treatment on the HMA pavement as shown.

Where a tapered edge is required, use the same type of HMA used for the adjacent lane or shoulder.

The edge of roadway where the tapered edge is to be placed must have a solid base, free of debris such as loose material, grass, weeds, or mud. Grade the areas to receive the tapered edge as required.

The tapered edge must be placed monolithic with the adjacent lane or shoulder and must be shaped and compacted with a device attached to the paver.

The device must be capable of shaping and compacting HMA to the required cross section as shown. Compaction must be accomplished by constraining the HMA to reduce the cross sectional area by 10 to 15 percent. The device must produce a uniform surface texture without tearing, shoving, or gouging and must not leave marks such as ridges and indentations. The device must be capable of transitioning to cross roads, driveways, and obstructions.

For the tapered edge, the angle of the slope must not deviate by more than ± 5 degrees from the angle shown. Measure the angle from the plane of the adjacent finished pavement surface.

If paving is done in multiple lifts, the tapered edge must be placed with each lift.

Short sections of hand work are allowed to construct tapered edge transitions.

39-2.01C(6) Widening Existing Pavement

If widening existing pavement, construct new pavement structure to match the elevation of the existing pavement's edge before placing HMA over the existing pavement.

39-2.01C(7) Shoulders, Medians, and Other Road Connections

Not Used

39-2.01C(8) Leveling

Not Used

39-2.01C(9) Miscellaneous Areas and Dikes

Not Used

39-2.01C(10)–39-2.01C(11) Reserved**39-2.01C(12) AC Plug / Pavement Tie-In**

Restore AC pavement between existing pavement and newly placed curb and gutter using a deep lift of HMA. The depth of HMA must be at least 10-inches.

39-2.01C(13) AC Driveway Conforms

Not Used

39-2.01C(14) Speed Humps, Road Humps, and Speed Tables

Not Used

39-2.01C(15) Compaction**39-2.01C(15)(a) General**

Rolling must leave the completed surface compacted and smooth without tearing, cracking, or shoving.

If a vibratory roller is used as a finish roller, turn the vibrator off.

Do not open new HMA pavement to traffic until its mid depth temperature is below 160 degrees F.

If the surface to be paved is both in sunlight and shade, pavement surface temperatures are taken in the shade.

39-2.01C(15)(b) Method Compaction

Use method compaction for any of the following conditions:

1. HMA pavement thickness shown is less than ~~0.45~~ 0.12 foot
2. Replace asphalt concrete surfacing
3. Leveling courses
4. Areas the Engineer determines conventional compaction and compaction measurement methods are impeded

HMA compaction coverage is the number of passes needed to cover the paving width. A pass is 1 roller's movement parallel to the paving in either direction. Overlapping passes are part of the coverage being made and are not a subsequent coverage. Do not start a coverage until completing the prior coverage.

Method compaction must consist of performing:

1. Breakdown compaction of each layer with 3 coverages using a vibratory roller. The speed of the vibratory roller in miles per hour must not exceed the vibrations per minute divided by 1,000. If the HMA layer thickness is less than 0.08 foot, turn the vibrator off.
2. Intermediate compaction of each layer of HMA with 3 coverages using a pneumatic-tired roller at a speed not to exceed 5 mph.
3. Finish compaction of HMA with 1 coverage using a steel-tired roller.

Start rolling at the lower edge and progress toward the highest part.

The Engineer may order fewer coverages if the layer thickness of HMA is less than ~~0.45~~ 0.12 foot.

The compacted lift thickness must not exceed 0.25 foot.

Any deviation from the above requirements must be approved in writing by the Engineer.

39-2.01C(15)(c)–39-2.01C(15)(e) Reserved**39-2.01C(16) Smoothness Corrections**

Not Used

39-2.01C(17) Data Cores

Not Used

39-2.01D Payment

The payment quantity for geosynthetic pavement interlayer is the area measured from the actual pavement covered.

~~Except for tack coat used in minor HMA, payment for tack coat is not included in the payment for hot mix asphalt.~~

The Agency does not adjust the unit price for an increase or decrease in the tack coat quantity.

The payment quantity for HMA of the type shown on the Bid Item List is measured based on the combined mixture weight. If recorded batch weights are printed automatically, the bid item for HMA is measured by using the printed batch weights, provided:

1. Total aggregate and supplemental fine aggregate weight per batch is printed. If supplemental fine aggregate is weighed cumulatively with the aggregate, the total aggregate batch weight must include the supplemental fine aggregate weight.
2. Total virgin asphalt binder weight per batch is printed.
3. Each truckload's zero tolerance weight is printed before weighing the first batch and after weighing the last batch.
4. Time, date, mix number, load number and truck identification is correlated with a load slip.
5. Copy of the recorded batch weights is certified by a licensed weigh master and submitted.

The payment quantity for place hot mix asphalt dike of the type shown on the Bid Item List is the length measured from end to end. ~~Payment for the HMA used to construct the dike is not included in the payment for place hot mix asphalt dike.~~

The payment quantity for place hot mix asphalt (miscellaneous areas) is the area measured for the in-place compacted area. ~~Payment for the HMA used for miscellaneous areas is not included in the payment for place hot mix asphalt (miscellaneous areas).~~

The payment quantity for speed humps, road humps, and speed tables is the length measured along the centerline to the nearest 0.1-foot.

The Engineer does not adjust the unit price for an increase or decrease in the prepaving grinding day quantity.

39-2.02 TYPE A HOT MIX ASPHALT

Comply with section 39-2.09 where any reference is made to section 39-2.02 Type A Hot Mix Asphalt.

39-2.03 RUBBERIZED HOT MIX ASPHALT–GAP GRADED

Not Used

39-2.04 OPEN GRADED FRICTION COURSES

Not Used

39-2.05 BONDED WEARING COURSES

Not Used

39-2.06 HOT MIX ASPHALT ON BRIDGE DECKS

Not Used

39-2.07 MINOR HOT MIX ASPHALT

Not Used

39-2.08 RESERVED**39-2.09 HOT MIX ASPHALT LOW VOLUME (HMA-LV)****39-2.09A General****39-2.09A(1) Summary**

Section 39-2.09 includes specifications issued by the California Asphalt Pavement Association (CalAPA) for producing and placing HMA-LV. You may produce HMA-LV using an authorized WMA technology.

39-2.09A(2) Definitions

Reserved

39-2.09A(3) Submittals**39-2.09A(3)(a) General**

Reserved

39-2.09A(3)(b) Job Mix Formula

The JMF must be based on the Superpave HMA mix design determined as described in *MS-2 Asphalt Mix Design Methods* by the Asphalt Institute as modified herein.

Use Superpave parameters associated with a 20-year Design ESAL range of **0.3 to <3**. Comply with JMF Level **II** requirements.

39-2.09A(3)(c) Reclaimed Asphalt Pavement

If requested by the Engineer, submit QC test results for RAP gradation with the combined aggregate gradation within 2 business days of taking RAP samples during HMA production.

39-2.09A(3)(d)–39-2.09A(3)(f) Reserved**39-2.09A(4) Quality Assurance****39-2.09A(4)(a) General**

Reserved

39-2.09A(4)(b) Quality Control**39-2.09A(4)(b)(i) General**

Reserved

39-2.09A(4)(b)(ii) Aggregates

Test the quality characteristics of aggregates under the test methods and frequencies shown in the following table:

Aggregate Testing Frequencies

<u>Quality characteristic</u>	<u>Test method</u>	<u>Minimum testing frequency</u>
<u>Gradation^a</u>	<u>AASHTO T 27</u>	<u>1 per 750 tons</u>
<u>Sand equivalent^{b, c}</u>	<u>AASHTO T 176</u>	
<u>Moisture content^d</u>	<u>AASHTO T 255</u>	
<u>Crushed particles</u>	<u>AASHTO T 335</u>	<u>Production Startup and 1 per 10,000 tons</u>
<u>Los Angeles Rattler</u>	<u>AASHTO T 96</u>	
<u>Flat and elongated particles</u>	<u>ASTM D4791</u>	
<u>Fine aggregate angularity^e</u>	<u>AASHTO T 304 Method A</u>	

^aIf RAP is used, test the combined aggregate gradation under California Test 384.

^bReported value must be the average of 3 tests from a single sample.

^cUse of a sand reading indicator is required as shown in AASHTO T176, Figure 1. Sections 4.7, "Manual Shaker," 7.1.2, "Alternate Method No. 2," and 8.4.3, "Hand Method," do not apply. Prepare the stock solution as specified in section 4.8.1, "Stock solution with formaldehyde," except omit the addition of formaldehyde.

^dTest at continuous mixing plants only. If RAP is used, test the RAP moisture content at continuous mixing plant and batch mixing plant.

^e Waived if 10% or less non-manufactured sand.

For lime treated aggregate, test aggregate before treatment and test for gradation and moisture content during HMA production.

39-2.09A(4)(b)(iii) Reclaimed Asphalt Pavement

During RAP production sample RAP at a minimum frequency of 1 sample per 1,000 tons with a minimum of 6 samples per stockpile and test for the following:

1. Binder content under AASHTO T308 and T164
2. Aggregate gradation under California Test 384

During HMA production, sample RAP daily and perform QC testing for:

1. Aggregate gradation using correlation factors from California Test 384 submitted with the job mix formula.
2. Moisture content under AASHTO T255 for continuous mix plants only.

39-2.09A(4)(b)(iv)–39-2.09A(4)(b)(viii) Reserved

39-2.09A(4)(b)(ix) Type A Hot Mix Asphalt Production

Test the quality characteristics of HMA under the test methods and frequencies shown in the following table:

Minimum Contractor Quality Control HMA Testing

<u>Quality characteristic</u>	<u>Test method</u>	<u>Minimum testing frequency</u>	
		<u>Level I</u>	<u>Level II</u>
<u>Asphalt binder content</u>	<u>AASHTOT 308 Method A</u>	<u>Production Start-up and 1 per 1,500 tons</u>	
<u>HMA moisture content</u>	<u>AASHTOT 329</u>	<u>1 per paving day</u>	
<u>Air void content</u>	<u>AASHTOT 269</u>	<u>Production Start-up and 1 per 4,000 tons</u>	<u>Production Start-up</u>
<u>Theoretical Maximum Specific Gravity</u>	<u>AASHTO T 209 Method A</u>	<u>1 per paving day</u>	
<u>Voids in the Mineral Aggregate</u>	<u>SP-2</u>	<u>Production Start-up and 1 for every 10,000 tons thereafter</u>	<u>NA</u>
<u>Hamburg Wheel Tracking</u>	<u>AASHTO T324 (Modified)</u>	<u>Production Start-up and 1 for every 10,000 tons thereafter</u>	<u>NA</u>

Note: For all Production Start-up sampling, reference 39-2.01A(4)(h)(v).

39-2.09A(4)(c)–39-2.09A(4)(d) Reserved

39-2.09A(4)(e) Engineer Acceptance

The Engineer accepts HMA-LV based on compliance with:

1. Aggregate quality requirements shown in the following table:

Aggregate Quality Requirements

<u>Quality characteristic</u>	<u>Test method</u>	<u>Requirement</u>	
		<u>Level I</u>	<u>Level II</u>
<u>Aggregate gradation^a</u>	<u>AASHTO T 27</u>	<u>JMF ± Tolerance</u>	
<u>Percent of crushed particles</u> <u>Coarse aggregate (min, %)</u> <u>One-fractured face</u> <u>Two-fractured faces</u>	<u>AASHTOT 335</u>	<u>50</u>	<u>25</u>
<u>Fine aggregate (min, %)</u> <u>(Passing No. 4 sieve</u> <u>and retained on No. 8 sieve.)</u> <u>One fractured face</u>		<u>50</u>	
		<u>20</u>	<u>20</u>
<u>Los Angeles Rattler (max, %)</u> <u>Loss at 100 Rev.</u> <u>Loss at 500 Rev.</u>	<u>AASHTOT 96</u>	<u>45</u>	<u>50</u>
<u>Sand equivalent (min.)^{b, c}</u>	<u>AASHTOT 176</u>	<u>45</u>	<u>42</u>
<u>Flat and elongated particles (max, %</u> <u>by weight at 5:1)</u>	<u>ASTM D4791</u>	<u>NA</u>	<u>NA</u>
<u>Nonmanufactured sand, (max, %)</u>		<u>10</u>	<u>20^d</u>

^aThe Engineer determines combined aggregate gradations containing RAP under California Test 384.

^bReported value must be the average of 3 tests from a single sample.

^cUse of a sand reading indicator is required as shown in AASHTO T 176, Figure 1. Sections 4.7, "Manual Shaker," 7.1.2, "Alternate Method No. 2," and 8.4.3, "Hand Method," do not apply. Prepare the stock solution as specified in section 4.8.1, "Stock solution with formaldehyde," except omit the addition of formaldehyde

^dSee note a HMA Mix Design Requirements Table in 39-2.09B(2)

2. In place HMA quality requirements shown in the following table:Type A HMA Acceptance In Place

		<u>Level I</u>	<u>Level II</u>
<u>Quality characteristic</u>	<u>Test method</u>		
<u>Asphalt binder content (%)</u>	<u>AASHTOT 308 Method A</u>	<u>JMF ± 0.50</u>	<u>JMF ± 0.50</u>
<u>HMA moisture content (max, %)</u>	<u>AASHTOT 329</u>	<u>1</u>	<u>1</u>
<u>Air voids content at N_{design} (%)^{a, b}</u>	<u>AASHTOT 269</u>	<u>4.0 ± 1.5</u>	<u>3.5 ± 2.0</u>
<u>Voids in mineral aggregate on plant-produced HMA (min, %)^a</u> <u>Gradation:</u> <u>No. 4</u> <u>3/8-inch</u> <u>1/2-inch</u> <u>3/4-inch</u>	<u>SP-2 Asphalt Mixture Volumetrics^c</u>	<u>15.0–18.0</u> <u>14.0–17.0</u> <u>13.0–16.0</u> <u>12.0–15.0</u>	<u>NA</u>
<u>Dust proportion</u>	<u>SP-2 Asphalt Mixture Volumetrics</u>	<u>0.5–1.4</u>	<u>NA</u>
<u>Relative Compaction-e, f</u>	<u>California Test 375</u>	<u>95.0 – 97.0</u>	<u>Method Compaction</u>

^aPrepare 3 briquettes. Report the average of 3 tests.^bThe Engineer determines the bulk specific gravity of each lab-compacted briquette under AASHTO T 275, Method A, and theoretical maximum specific gravity under AASHTO T 209, Method A.^cDetermine bulk specific gravity under AASHTO T 275, Method A.^eThe Engineer determines Relative Compaction under California Test 375^fThe Engineer determines maximum density under California Test 30839-2.09B Materials39-2.09B(1) GeneralReserved39-2.09B(2) Hot Mix Asphalt Mix DesignThe mix design for HMA must comply with the requirements shown in the following tables:HMA Mix Design Requirements

<u>Quality characteristic</u>	<u>Test method</u>	<u>Level I</u>	<u>Level II</u>
<u>Air voids content (%)</u>	<u>AASHTO T 269^a</u>	<u>N_{design} = 4.0</u>	<u>N_{design} = 3.5</u>
<u>Voids in mineral aggregate (min, %)^b</u> <u>Gradation:</u> <u>No. 4</u> <u>3/8-inch</u> <u>1/2-inch</u> <u>3/4-inch</u>	<u>SP-2 Asphalt Mixture Volumetrics</u>	<u>16.0–19.0</u> <u>15.0–18.0</u> <u>14.0–17.0</u> <u>13.0–16.0</u>	<u>15.5–18.5</u> <u>14.5–17.5</u> <u>13.5–16.5</u> <u>12.5–15.5</u>
<u>Dust proportion</u>	<u>SP-2 Asphalt Mixture Volumetrics</u>	<u>0.5–1.4</u>	<u>NA</u>

^a Calculate the air voids content of each specimen using AASHTO T 275, Method A, to determine bulk specific gravity. Use AASHTO T 209, Method A to determine theoretical maximum specific gravity. Use a pycnometer and digital manometer when performing AASHTO T 209.

b Measure bulk specific gravity using AASHTO T 275, Method A.

For HMA-LV mixtures using RAP, the maximum allowed binder replacement is 25.0 percent in the upper 0.2 foot exclusive of OGFC and 40.0 percent below. The binder replacement is calculated as a percentage of the approved JMF target asphalt binder content.

For HMA-LV with a binder replacement percent less than or equal to 20 percent of your specified OBC, you may request that the performance graded asphalt binder grade with upper and lower temperature classifications be reduced by 6 degrees C from the specified grade.

For HMA-LV with a binder replacement greater than 20 percent of your specified OBC and less than or equal to 40 percent of OBC, you must use a performance graded asphalt binder grade with upper and lower temperature classifications reduced by 6 degrees C from the specified grade.

39-2.09B(3) Asphalt Binder

The grade of asphalt binder for HMA-LV must be PG 64-10.

39-2.09B(4) Aggregates39-2.09B(4)(a) General

Before the addition of asphalt binder and lime treatment, the aggregates must comply with the requirements shown in the following table:

<u>Aggregate Quality</u>			
<u>Quality characteristic</u>	<u>Test method</u>	<u>Requirement</u>	
		<u>Level I</u>	<u>Level II</u>
<u>Aggregate gradation^a</u>	<u>AASHTO T 27</u>	<u>JMF ± Tolerance</u>	
<u>Percent of crushed particles</u>	<u>AASHTOT 335</u>		
<u>Coarse aggregate (min, %)</u>			
<u>One-fractured face</u>		<u>50</u>	<u>25</u>
<u>Two-fractured faces</u>		<u>50</u>	
<u>Fine aggregate (min, %)</u>	<u>AASHTOT 335</u>		
<u>(Passing No. 4 sieve and retained on No. 8 sieve.)</u>			
<u>One fractured face</u>		<u>20</u>	<u>20</u>
<u>Los Angeles Rattler (max, %)</u>	<u>AASHTOT 96</u>		
<u>Loss at 100 Rev.</u>			
<u>Loss at 500 Rev.</u>		<u>45</u>	<u>50</u>
<u>Sand equivalent (min.)^{b, c}</u>	<u>AASHTOT 176</u>	<u>45</u>	<u>42</u>
<u>Flat and elongated particles (max, % by weight at 5:1)</u>	<u>ASTM D4791</u>	<u>NA</u>	<u>NA</u>
<u>Nonmanufactured sand, (max, %)</u>		<u>10</u>	<u>20^d</u>

^aThe Engineer determines combined aggregate gradations containing RAP under California Test 384.

^bReported value must be the average of 3 tests from a single sample.

^cUse of a sand reading indicator is required as shown in AASHTO T 176, Figure 1 Sections 4.7, "Manual Shaker," 7.1.2, "Alternate Method No. 2," and 8.4.3, "Hand Method," do not apply. Prepare the stock solution as specified in section 4.8.1, "Stock solution with formaldehyde," except omit the addition of formaldehyde

^dSee Mix Design Table in 39-2.09B

39-2.09B(4)(b) Aggregate Size and Gradations

Unless otherwise indicated in contract documents the ratio of HMA-LV lift thickness to nominal maximum aggregate size must be a minimum of 3:1. If the aggregate gradations for HMA-LV is not specified, aggregate gradations must comply with the requirements shown in the following table:

Aggregate Gradation Requirements

<u>HMA pavement thickness shown</u>	<u>Gradation</u>
0.10 foot	3/8 inch
Greater than 0.10 to less than 0.20 foot	1/2 inch
0.20 to less than 0.25 foot	1/2.20 to less
0.25 foot or greater	3/4 inch

Aggregate gradation must be within the TV limits for the specified sieve size shown in the following tables: Aggregate Gradations for Type A HMA (Percentage Passing)

3/4 inch

<u>Sieve size</u>	<u>Target value limit</u>	<u>Allowable tolerance</u>
1"	100	--
3/4"	90-98	TV±5
1/2"	70-90	TV±6
No.4	42-58	TV±5
No.8	29-43	TV±5
No.30	10-23	TV±4
No.200	2.0-7.0	TV±2.0

1/2 inch

<u>Sieve size</u>	<u>Target value limit</u>	<u>Allowable tolerance</u>
3/4"	100	--
1/2"	95-98	TV±5
3/8"	72-95	TV±5
No.4	52-69	TV±5
No.8	35-55	TV±5
No.30	15-30	TV±4
No.200	2.0-8.0	TV±2.0

3/8 inch

<u>Sieve size</u>	<u>Target value limit</u>	<u>Allowable tolerance</u>
1/2"	100	--
3/8"	95-98	TV±5
No.4	55-75	TV±5
No.8	30-50	TV±5
No.30	15-35	TV±5
No.200	2.0-9.0	TV±2.0

No. 4

<u>Sieve size</u>	<u>Target value limit</u>	<u>Allowable tolerance</u>
3/8"	100	--
No.4	95-98	TV±5
No.8	70-80	TV±6
No.30	34-45	TV±5
No.200	2.0-12.0	TV±4.0

39-2.09B(5) Reclaimed Asphalt Pavement

You may substitute RAP for part of the virgin aggregate in a quantity up to 25 percent not to exceed 15 percent of the aggregate blend.

Provide enough space at your plant for complying with all RAP handling requirements. Provide a clean, graded base, well drained area for stockpiles.

If RAP is from multiple sources, blend the RAP thoroughly.

Isolate the RAP stockpiles from other materials. Store RAP in conical or longitudinal stockpiles. RAP must not be agglomerated or be allowed to congeal in large stockpiles.

39-2.09B(6)–39-2.09B(10) Reserved**39-2.09B(11) Type A Hot Mix Asphalt Production**

If RAP is used, the asphalt plant must automatically adjust the virgin asphalt binder to account for RAP percentage and RAP binder.

During production, you may adjust hot-or cold-feed proportion controls for virgin aggregate and RAP. RAP must be within ± 3 of RAP percentage described in your Contractor Job Mix Formula Proposal form.

39-2.09C Construction

Where the pavement thickness shown is greater than 0.30 foot, you may place HMA-LV in multiple lifts not less than 0.15 foot each. If placing HMA-LV in multiple lifts:

1. Aggregate gradation must comply with the requirements shown in the following table:

Aggregate Gradation Requirements

<u>HMA-LV lift thickness</u>	<u>Gradation</u>
<u>0.15 to less than 0.20 foot</u>	<u>1/2 inch</u>
<u>0.20 foot to less than 0.25 foot</u>	<u>3/4 inch</u>
<u>0.25 foot or greater</u>	<u>3/4 inch</u>

2. Apply a tack coat before placing a subsequent lift
3. The Engineer evaluates each HMA lift individually for compliance

If the ambient air temperature is below 60 degrees F, cover the loads in trucks with tarpaulins. If the time for HMA discharge to truck at the HMA plant until transfer to paver's hopper is 90 minutes or greater and if the ambient air temperature is below 70 degrees F, cover the loads in trucks with tarpaulins, unless the time from discharging to the truck until transfer to the paver's hopper or the pavement surface is less than 30 minutes. The tarpaulins must completely cover the exposed load until you transfer the mixture to the paver's hopper or the pavement surface.

Spread Type A HMA at the ambient air and surface temperatures shown in the following table:

07-15-16

Minimum Ambient Air and Surface Temperatures

<u>Lift thickness (feet)</u>	<u>Ambient air (°F)</u>		<u>Surface (°F)</u>	
	<u>Unmodified asphalt binder</u>	<u>Modified asphalt binder</u>	<u>Unmodified asphalt binder</u>	<u>Modified asphalt binder</u>
<u>Type A HMA and Type A HMA produced with WMA water injection technology</u>				
<u><0.15</u>	<u>55</u>	<u>50</u>	<u>60</u>	<u>55</u>
<u>≥0.15</u>	<u>45</u>	<u>45</u>	<u>50</u>	<u>50</u>
<u>Type A HMA produced with WMA additive technology</u>				
<u><0.15</u>	<u>45</u>	<u>45</u>	<u>50</u>	<u>45</u>
<u>≥0.15</u>	<u>40</u>	<u>40</u>	<u>40</u>	<u>40</u>

For method compaction, the maximum lift thickness must be 0.25 foot.

For HMA-LV and HMA-LV produced with water-injection technology placed under method compaction, if the asphalt binder is:

1. Unmodified, complete:
 - a. 1st coverage of breakdown compaction before the surface temperature drops below 250 degrees F
 - b. Breakdown and intermediate compaction before the surface temperature drops below 190 degrees F
 - c. Finish compaction before the surface temperature drops below 150 degrees F.
2. Modified, complete:
 - a. 1st coverage of breakdown compaction before the surface temperature drops below 240 degrees F
 - b. Breakdown and intermediate compaction before the surface temperature drops below 180 degrees F
 - c. Finish compaction before the surface temperature drops below 140 degrees F.

For HMA produced with WMA additive technology placed under method compaction, if the asphalt binder is:

1. Unmodified, complete:
 - a. 1st coverage of breakdown compaction before the surface temperature drops below 240 degrees F
 - b. Breakdown and intermediate compaction before the surface temperature drops below 190 degrees F
 - c. Finish compaction before the surface temperature drops below 140 degrees F.
 - d. You may continue static rolling below 140 degrees F to remove roller marks.
2. Modified, complete:
 - a. 1st coverage of breakdown compaction before the surface temperature drops below 230 degrees F
 - b. Breakdown and intermediate compaction before the surface temperature drops below 170 degrees F
 - c. Finish compaction before the surface temperature drops below 130 degrees F.
 - d. You may continue static rolling below 130 degrees F to remove roller marks.

You may cool HMA with water when rolling activities are complete if authorized.

39-2.09D Payment

Not Used

39-2.10 RESERVED

39-3 EXISTING ASPHALT CONCRETE

39-3.01 GENERAL

39-3.01A General

Section 39-3.01 includes general specifications for performing work on existing asphalt concrete facilities.

Work performed on existing asphalt concrete facilities must comply with section 15.

39-3.01B Materials

Not Used

39-3.01C Construction

Before removing a portion of an asphalt concrete facility, make a 2-inch deep saw cut to a true line along the limits of the removal area.

39-3.01D Payment

Payment for removal of pavement fabric is included as part of the bid items involved.

39-3.02 REPLACE ASPHALT CONCRETE SURFACING**39-3.02A General**

Section 39-3.02 includes specifications for replacing asphalt concrete surfacing.

39-3.02B Materials

HMA to be used for replacing asphalt concrete surfacing must comply with ~~Type A~~ HMA-LV as specified in section ~~39-2.02~~ 39-2.09.

The grade of asphalt binder must be PG 64-10 ~~or PG 64-16~~.

Tack coat must comply with section 39-2.01B(10).

39-3.02C Construction

Where replace asphalt concrete surfacing is shown, remove the full depth of the existing asphalt concrete surfacing and replace with HMA. The Engineer determines the exact limits of asphalt concrete surfacing to be replaced.

The Engineer demarcates the corners of rectangular areas of asphalt concrete surfacing to be replaced. Offset rectangles may overlap, but the minimum size of rectangles will be 4 x 4 ft. For convenience, you may replace pavement beyond the identified limits at your expense.

Surfacing to be replaced at locations of base failure must be replaced during the same day as surfacing removal.

Replace asphalt concrete in a lane before the lane is specified to be opened to traffic.

Exercise extreme caution in the vicinity of traffic detectors and conduits. Any detector you damage must be replaced within 72 hours by an approved electrical contractor at your expense. The location of traffic detectors will be marked on the pavement if you submit a request at least 3 days in advance.

Before removing asphalt concrete, outline the replacement area and cut neat lines with a saw or grind to full depth of the existing asphalt concrete. Do not damage asphalt concrete and base remaining in place.

If you excavate the base beyond the specified plane, replace it with HMA.

Do not use a material transfer vehicle for replacing asphalt concrete surfacing.

Before placing HMA, apply a tack coat as specified in section 39-2.01C(3)(f).

Place HMA using method compaction as specified in section 39-2.01C(2)(c).

39-3.02D Payment

The payment quantity for replace asphalt concrete surfacing is the volume determined from the dimensions shown. If not shown, the payment quantity depends on the bid item quantity and is:

1. The volume determined from the measured depth of surfacing and base replaced with HMA within the Engineer's demarcated limits
2. The area of the demarcated limits
3. The weight of HMA placed within the demarcated limits

If the Bid Item List includes roadway excavation (unsuitable material), it does not apply where base material is replaced with HMA.

39-3.03 REMOVE ASPHALT CONCRETE DIKES

Not Used

SECTION 39

ASPHALT CONCRETE

39-3.04 COLD PLANING ASPHALT CONCRETE PAVEMENT

Not Used

39-3.05 REMOVE BASE AND SURFACING

Not Used

39-3.06–39-3.08 RESERVED

DIVISION VI STRUCTURES

Replace section 45 with:

45 GENERAL

Not Used

Replace section 51 with:

51 CONCRETE STRUCTURES

51-1 GENERAL

51-1.01 GENERAL

51-1.01A Summary

Section 51-1 includes general specifications for constructing concrete structures.

Earthwork for the following concrete structures must comply with section 19-3:

1. Sound wall footings
2. Sound wall pile caps
3. Culverts
4. Barrier slabs
5. Junction structures
6. Minor structures
7. Pipe culvert headwalls, endwalls, and wingwalls
8. Pile extensions
9. Drainage inlets

Falsework must comply with section 48-2.

Joints must comply with section 51-2.

Elastomeric bearing pads must comply with section 51-3.02.

Reinforcement for the following concrete structures must comply with section 52:

1. Sound wall footings
2. Sound wall pile caps
3. Barrier slabs
4. Junction structures
5. Minor structures
6. PC concrete members
7. Drainage inlets
8. Pipe culvert headwalls and endwalls for a pipe with a diameter of less than 5 feet

You may use RSC for a concrete structure only where the specifications allow the use of RSC.

51-1.01B Definitions

form panel: Continuous section of form facing material, unbroken by joint marks, against which concrete is placed.

opening age: Minimum age at which an element constructed with RSC may be opened to traffic.

age of break: Age in hours, determined by your testing, at which RSC attains its minimum specified compressive strength.

pier column: Extension of a column or pier into bedrock material.

51-1.01C Submittals

Not Used

51-1.01D Quality Assurance

51-1.01D(1) General

Reserved

SECTION 51**CONCRETE STRUCTURES****51-1.01D(2) Quality Control****51-1.01D(2)(a) General**

Reserved

51-1.01D(2)(b) Rapid Strength ConcreteNot Used**51-1.02 MATERIALS****51-1.02A General**

Reserved

51-1.02B Concrete

Except for minor structures, the cementitious material content per cubic yard of concrete in structures or portions of structures must comply with the content shown in the following table:

Use	Cementitious material content (lb/cu yd)
Deck slabs and slab spans of bridges	675–800
Roof sections of exposed top box culverts	675–800
Pier columns	675–800
Seal courses	675 min
Other portions of structures	590–800
Concrete for PC members	590–925

Except for minor structures, the minimum required 28-day compressive strength for concrete in structures or portions of structures is the compressive strength described or 3,600 psi, whichever is greater.

51-1.02C Bonding MaterialsNot Used**51-1.02D Rapid Strength Concrete**Not Used**51-1.02E Colored Concrete**Not Used**51-1.02F Mortar**

Mortar must be composed of cement, sand, and water. Materials for mortar must comply with section 90. The proportion of sand to cement measured by volume must be 2 to 1. Mortar must contain only enough water to allow placing and packing. Sand particles must be no larger than 1/2 the size of the recess or space in which the mortar is to be placed.

51-1.02G Grout

Grout must consist of portland cement and water, with a water content of at most 4 gallons per 94 pounds of cement.

51-1.02H Chemical AdhesivesNot Used**51-1.02I Miscellaneous Metal**

Materials for access opening covers for new structures must comply with section 75-3.

Metal frames, covers, grates, and other miscellaneous iron and steel used with drainage inlets must comply with section 75-2.

51-1.02J Miscellaneous Materials

Not Used

51-1.03 CONSTRUCTION**51-1.03A General**

Reserved

51-1.03B Methods and Equipment

Not Used

51-1.03C Preparation**51-1.03C(1) General**

Bottom of footing elevations shown are approximate.

The Engineer may order changes in footing dimensions or elevations.

Where a roughened concrete surface is described, roughen the existing concrete surface to a full amplitude of approximately 1/4 inch by abrasive blasting, water blasting, or using mechanical equipment.

Pump water from the interior of foundation enclosures without removing concrete materials. Do not pump water during concrete placement or for 24 hours after placing concrete, unless the pumping is done from a sump separated from the concrete work.

51-1.03C(2) Forms**51-1.03C(2)(a) General**

Forms must be:

1. Mortar tight
2. True to the dimensions, lines, and grades of the structure
3. Strong enough to prevent deflection during concrete placement

Face exposed surfaces of concrete structures with form panels.

Form panels for exposed surfaces must be plywood complying with or exceeding the requirements of U.S. Product Standard PS 1 for Exterior B-B (Concrete Form) Class I Plywood or any material that produces a similarly smooth, uniform surface. For exposed surfaces, use only form panels in good condition and free of defects such as scars, dents, or delaminations.

Design and construct forms for exposed surfaces such that surfaces do not undulate more than 3/32 inch or 1/270 of the center-to-center distance between studs, joists, form stiffeners, form fasteners, or wales in any direction. Stop using forms or forming systems that produce excessive undulations until modifications satisfactory to the Engineer are made. The Engineer may reject portions of structures with excessive undulations.

Form exposed surfaces of each element of a concrete structure with the same forming material or with materials that produce similar surface textures, color, and appearance.

Use form panels in uniform widths of at least 3 feet and uniform lengths of at least 6 feet except at the ends of continuously formed surfaces where the final panel length is less than 6 feet. For members less than 3 feet wide, form panels must be the width of the entire member.

Arrange form panels in symmetrical patterns conforming to the general lines of the structure. Place panels for vertical surfaces with the long dimension horizontal and horizontal joints level and continuous.

Form panels for curved column surfaces must be continuous for at least 1/4 of the circumference or 6 feet. For walls with sloping footings that do not abut other walls, you may place panels with the long dimension parallel to the footing.

Align form panels on each side of panel joints with supports or fasteners common to both panels so that a continuous, unbroken concrete plane results. Form filler panels that join prefabricated panels must (1)

have a uniform width of at least 1 foot and (2) produce a smooth, uniform surface with consistent longitudinal joint lines between panels.

Construct forms for exposed surfaces with triangular fillets at least 3/4 by 3/4 inch. Attach fillets so as to prevent mortar runs and to produce smooth, straight chamfers at all sharp edges of the concrete.

For drainage inlets, extend the outside forms at least 12 inches below the top of the inlet. You may place concrete against excavated earth below this depth except:

1. You must use full-depth outside forms or other protection when work activities or unstable earth may cause hazardous conditions or contamination of the concrete.
2. You must increase the wall thickness 2 inches if placing concrete against the excavated surface. The interior dimensions must be as shown.

Clean inside form surfaces of dirt, mortar, and foreign material. Thoroughly coat forms to be removed with form oil before placing concrete. Form oil must:

1. Be commercial quality or an equivalent coating
2. Allow the ready release of forms
3. Not discolor the concrete

Do not place concrete in forms until:

1. All form construction work has been completed, including removing foreign material
2. All materials to be embedded in the concrete have been placed
3. Engineer has inspected the forms

Forms for concrete surfaces that will not be completely enclosed or hidden below the permanent ground surface must comply with the specifications for forms for exposed surfaces. Interior surfaces of underground drainage structures are considered completely enclosed surfaces.

Use form fasteners to prevent form spreading during concrete placement. Do not use twisted wire ties to hold forms in position.

Form fasteners and anchors must be of those types that can be removed as specified for form bolts in section 51-1.03F(2) without chipping, spalling, heating or otherwise damaging the concrete surface.

You may cast anchor devices into the concrete for supporting forms or lifting PC members. Do not use driven types of anchorages for fastening forms or form supports to concrete except for interior surfaces of girders in PS box girder bridges where:

1. Girders have more than 2 inches of cover over the reinforcement
2. Anchorages do not penetrate the girder more than 2 inches and have a minimum spacing of 6 inches
3. Anchorages are placed at least 3 inches clear from the edge of concrete

51-1.03C(2)(b) Removing Forms

Remove all forms, except soffit forms for deck slabs of CIP box girders, forms for the interior voids of PC members, and the forms in hollow abutments or piers may remain in place for any of the following conditions:

1. Permanent access into the cells or voids is not shown
2. Utility facilities are not to be installed in the completed cells or voids
3. Utility facilities to be installed in completed cells or voids are to be inserted into casings that are placed before the completion of the cell or void
4. Permanent access is shown or utility facilities other than those in preplaced casings are to be installed in cells or voids, and you:
 - 4.1 Remove the portions of the forms that obstruct access openings or conflict with utility facilities.
 - 4.2 Provide a longitudinal crawl space at least 3 feet high and 2 feet wide throughout the length of these cells or voids
 - 4.3 Use a forming system that leaves no sharp projections into the cells or voids

- 4.4 Remove forms between the hinge and 5 feet past the access openings in cells of CIP box girder bridges with access openings near the hinges

Clear the inside of the cells or voids of all loose material before completing the forming for the deck of CIP box girders or for the cells or voids of other members when the forms are to remain in place, or after the removal of the forms or portions of forms.

You may remove forms that do not support the dead load of concrete if 24 hours have elapsed after concrete placement and the concrete has sufficient strength to prevent damage to the surface.

You may remove forms for railings or barriers after the concrete has hardened. Protect exposed surfaces from damage.

For drainage inlets, remove exterior forms to at least 12 inches below the final ground surface. Exterior forms below this depth may remain if their total thickness is not more than 1 inch.

51-1.03C(2)(c) Permanent Steel Deck Forms

Not Used

51-1.03D Placing Concrete

51-1.03D(1) General

Thoroughly moisten forms and subgrade with water immediately before placing concrete.

Place and consolidate concrete using methods that (1) do not cause segregation of the aggregate and (2) produce dense, homogeneous concrete without voids or rock pockets.

Place concrete while fresh and before initial set. Do not retemper partially hardened concrete with additional water.

Place concrete continuously in each integral part of the structure. Do not start work unless placement can be completed uninterrupted.

Place concrete for girder spans in at least 2 operations. The last operation must consist of placing the deck slab. Allow at least 5 days between operations.

Place concrete as close to its final position as possible. Do not use vibrators for extensive shifting of concrete.

Except for CIP piles, do not allow fresh concrete to fall more than 8 feet without using pipes, tubes, or double belting to prevent segregation. Do not use double belting unless the member thickness is less than 16 inches.

Except for concrete placed as pipe culvert headwalls and endwalls, slope paving and aprons, and concrete placed under water, consolidate concrete using high-frequency internal vibrators within 15 minutes of placing concrete in the forms. Do not attach vibrators to or hold them against forms or reinforcing steel. Do not displace reinforcement, ducts, or prestressing steel during vibrating.

For structure footings over 2.5 feet in depth that have a top layer of reinforcement, reconsolidate the concrete to a depth of 1 foot after placing, consolidating, and initial screeding of the concrete. Reconsolidate the concrete as late as the concrete will respond again to vibration but not less than 15 minutes after the initial screeding.

Vibrators used for concrete with epoxy-coated reinforcement or prestressing steel must have a resilient covering to prevent damage to the epoxy coating.

If concrete is inaccessible for adequate consolidation by other means, external vibrators must be used and the forms must be sufficiently rigid to resist displacement or damage.

Do not place concrete for horizontal members until the concrete in supporting vertical members has been consolidated and settlement due to bleeding is complete.

Where shown, apply a bond breaker to joint surfaces.

Do not construct drainage structures to final grade until adjacent paving or surfacing is complete.

If using a mobile volumetric mixer, before each work shift and after each time the mixer is washed out, discharge at least 2 cubic feet of RSC into a concrete waste container before placing RSC into the work.

51-1.03D(2) Concrete Bridge Decks

Not Used

51-1.03D(3) Concrete Placed Under Water

Not Used

51-1.03D(4) Construction Joints

Place construction joints only where described unless authorized.

At horizontal construction joints:

1. Thoroughly consolidate fresh concrete surfaces without completely removing surface irregularities
2. At joints between girder stems and decks, roughen the surfaces of fresh concrete to at least a 1/4-inch amplitude

Abrasive blast clean construction joint surfaces before placing fresh concrete against the joint surfaces. Remove surface laitance, curing compound, and other foreign materials.

Flush construction joint surfaces with water and allow the surfaces to dry to a surface-dry condition immediately before placing concrete.

If authorized in an emergency, you may place a construction joint at a location not described. The Engineer determines the location of the construction joint and the quantity of additional reinforcing steel to be placed across the joint.

Locate longitudinal construction joints in bridge decks along lane lines if a joint location is not shown.

51-1.03D(5) Colored Concrete

Not Used

51-1.03D(6) Bearing Surfaces

Not Used

51-1.03D(7) Pier Columns

Not Used

51-1.03E Miscellaneous Construction**51-1.03E(1) General**

Not Used

51-1.03E(2) Placing Mortar

Place mortar in recesses and holes, on surfaces, under structural members, and at other locations where described.

Clean concrete areas to be in contact with mortar of loose or foreign material that would prevent bonding between the mortar and the concrete surfaces. Flush the concrete areas with water and allow them to dry to a surface-dry condition immediately before placing the mortar.

Tightly pack mortar to completely fill spaces. Locations where mortar can escape must be mortar-tight before placing mortar. Cure mortar for 3 days using the water method under section 90-1.03B.

Do not load mortar until 72 hours after placement unless authorized.

51-1.03E(3) Drill and Bond Dowels

For drill and bond dowels, drill the holes without damaging the adjacent concrete. Holes for bonded dowels must be 1/2 inch larger than the nominal dowel diameter.

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If reinforcement is encountered during drilling before the specified depth is attained, notify the Engineer. Unless coring through the reinforcement is authorized, drill a new hole adjacent to the rejected hole to the depth shown.

Coat the surface of any dowel coated with zinc or cadmium with a colored lacquer. Allow the lacquer to dry thoroughly before installing the dowel.

Each drilled hole must be clean and dry when placing the bonding material and dowel. The bonding material and dowel must completely fill the drilled hole. The surface temperature must be at least 40 degrees F when magnesium phosphate concrete is placed.

Thoroughly dry finishing tools cleaned with water before working magnesium phosphate concrete.

Leave dowels undisturbed for 3 hours or until the dowels can be supported by the concrete.

Cure modified high-alumina-based concrete and portland-cement-based concrete using the curing compound method. Do not cure magnesium phosphate concrete.

Replace dowels that fail to bond or are damaged.

51-1.03E(4) Drill and Grout Dowels

Drill the holes under section 51-1.03E(3).

For drill and grout dowels, drill the holes 1/4 inch larger than the nominal dowel diameter. Immediately before placing dowels, holes must be cleaned, be thoroughly saturated with water, have all free water removed, and be dried to a saturated surface dry condition.

Place grout into the holes and insert the dowels. Retempering of grout is not allowed. Cure grout at least 3 days or until the dowels are encased in concrete. Immobilize the dowels during the curing period. Cure using curing compound method or by keeping the surface continuously damp.

Replace dowels that fail to bond or are damaged.

51-1.03E(5) Drill and Bond Dowels (Chemical Adhesive)

For drill and bond dowel (chemical adhesive), install dowels under the chemical adhesive manufacturer's instructions.

Drill the holes without damaging the adjacent concrete. If reinforcement is encountered during drilling before the specified depth is attained, notify the Engineer. Unless coring through the reinforcement is authorized, drill a new hole adjacent to the rejected hole to the depth shown.

Immediately after inserting the dowels into the chemical adhesive, support the dowels as necessary to prevent movement until the epoxy has cured the minimum time specified in the Authorized Material List for chemical adhesive/cartridge epoxies.

Replace dowels that fail to bond or are damaged. Drill new holes adjacent to rejected dowels and install replacement dowels.

51-1.03E(6) Nonskid Abrasive Finish

Not Used

51-1.03E(7) Drains in Walls

Not Used

51-1.03E(8) Deck Bleeder Drains

Not Used

51-1.03E(9) Utility Facilities

Not Used

51-1.03E(10) Concrete Headers and Steel Plates

Concrete for concrete headers must comply with the specifications for minor concrete.

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Steel plates and attachment hardware must comply with section 75-1 except that galvanizing is not required.

51-1.03E(11) Diaphragm Bolsters

Reserved

51-1.03E(12) Hinge Tiedowns

Reserved

51-1.03F Finishing Concrete**51-1.03F(1) General**

Strike off exposed surfaces of consolidated concrete to the lines and grades shown. Provide a uniform surface texture having the specified finish without undulations or irregularities.

The Engineer determines the acceptability of the surface finishes.

Finish sidewalks, curbs, and stairways on structures under section 73-3 except surfaces are not marked.

51-1.03F(2) Ordinary Surface Finish

Apply ordinary surface finish to all concrete surfaces as a final finish or before applying a higher class finish.

Ordinary surface finish must be the final finish for the following surfaces:

1. Undersurfaces of slab spans, box girders, spandrel arch spans, and floor slabs between girders of superstructures
2. Inside vertical surfaces of T girders of superstructures
3. Surfaces to be buried underground or covered with embankment and surfaces of culverts above finished ground that are not visible from the traveled way
4. Interior and top surfaces of drainage inlets

Ordinary surface finish includes:

1. Filling holes or depressions
2. Repairing rock pockets and unsound concrete
3. Removing fins and projections flush to the surface
4. Removing stains and discolorations visible from traveled ways

You do not need to remove fins from surfaces that are buried underground or enclosed.

Remove form bolts and metal placed for your convenience to at least 1 inch below the concrete surface. Clean and fill the resulting holes with mortar. You do not need to remove form bolts in box girder cells except you must remove bolts flush if deck forms are removed from the cells.

Fill bolt holes with mortar under section 51-1.03E(2). Fill depressions and pockets with packed mortar or shotcrete as determined by the Engineer. Cure filler under section 51-1.03H.

For exposed surfaces, add enough white cement to the patching material to match the surrounding concrete after drying.

If the Engineer determines that rock pockets are extensive, remove and replace the affected portions of the structure.

51-1.03F(3) Class 1 Surface Finish

Class 1 surface finish includes finishing concrete surfaces to produce smooth, even surfaces of uniform texture and appearance without bulges, depressions, or other imperfections.

Class 1 surface finish must be the final surface finish for the following surfaces:

1. Except for those surfaces listed in ordinary surface finish, the surfaces of bridge superstructures, including the undersurfaces of deck overhangs

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2. Surfaces of bridge piers, piles, columns, and abutments, and retaining walls above finished ground and to at least 1 foot below finished ground
3. Surfaces of open spandrel arch rings, spandrel columns, and abutment towers
4. Surfaces of pedestrian undercrossings, except floors and surfaces to be covered with earth
5. Surfaces of culvert headwalls above finished ground and endwalls visible from a traveled way
6. Interior surfaces of culvert barrels having a height of 4 feet or more for a distance equal to the culvert height where visible from a traveled way
7. Interior surfaces of pump house motor and control rooms and engine-generator rooms
8. Surfaces of railings

Do not apply Class 1 surface finish until a uniform appearance can be attained.

Use power carborundum stones or disks to remove bulges and other imperfections.

Sand areas not complying with the Class 1 surface finish requirements using power sanders or other authorized abrasive means until the specified surface finish is attained.

51-1.03F(4) Class 2 Surface Finish

Not Used

51-1.03F(5) Finishing Roadway Surfaces

Not Used

51-1.03G Concrete Surface Textures

Not Used

51-1.03H Curing Concrete Structures

Not Used

51-1.03I Protecting Concrete Structures

Maintain concrete at a temperature of not less than 45 degrees F for 72 hours after placing and at not less than 40 degrees F for an additional 4 days.

51-1.03J Temporary Decking

Not Used

51-1.04 PAYMENT

The payment quantity for seal course concrete is the actual volume of seal course concrete placed except the maximum payment quantity is the volume of concrete contained between vertical planes 1 foot outside the neat lines of the seal course shown. The Agency does not adjust the unit price for an increase or decrease in the seal course concrete quantity.

The payment quantity for structural concrete, drainage inlet is the volume determined from the dimensions shown for CIP drainage inlets.

51-2 JOINTS

Not Used

51-3 BEARINGS

Not Used

51-4 PRECAST CONCRETE MEMBERS

Not Used

51-5 APPROACH SLABS

Not Used

51-6 MASS CONCRETE

Not Used

51-7 MINOR STRUCTURES

51-7.01 GENERAL

51-7.01A General

Section 51-7 includes specifications for constructing minor structures.

Minor structures include structures described as minor structures. The “Trench Drain” shown on Sheet 11 is a minor structure. Bid Item 20.

51-7.01B Materials

Concrete must comply with the specifications for minor concrete.

Nonshrink grout must be a dry, packaged type complying with ASTM C1107/C1107M.

Metal frames, covers, grates, and other miscellaneous iron and steel used with minor structures must comply with section 75-2.

51-7.01C Construction

~~You may construct minor structures using PC units or a combination of PC and CIP structures as an alternative to CIP construction, provided that the structure in place substantially complies with the specified CIP construction.~~

Remove exterior forms to at least 5 inches below the final ground surface. Exterior forms below this depth may remain if their total thickness is not more than 1 inch.

Cure concrete surfaces of minor structures using the water method, the forms-in-place method, or the curing compound method.

51-7.01D Payment

The Agency does not adjust the payment quantity for minor structures designated as final pay on the Bid Item List if the constructed height of the minor structure is within 6 inches of the vertical dimensions shown.

Metal frames and covers or frames and grates are ~~not~~ included in the payment for minor structures.

Note that the Class 2 AB shown as part of the “Trench Drain” on Sheet 11 is not the same as Class 2 Permeable Base (Bid Item 21). The Class 2 AB is included as part of the “Minor Concrete (Trench Drain)” bid item.

51-8–51-15 RESERVED

Replace section 52 with:

52 REINFORCEMENT

52-1 GENERAL

52-1.01 GENERAL

52-1.01A Summary

Section 52-1 includes general specifications for fabricating and placing reinforcement.

52-1.01B Definitions

affected zone: Portion of the reinforcing bar where any properties of the bar, including the physical, metallurgical, or material characteristics, have been changed by either:

1. Fabrication or installation of a splice. The weld and 1 inch adjacent to the weld is part of the affected zone.
2. Manufacturing process for headed bar reinforcement.

lot:

1. 150 count, or fraction thereof, of the same type of mechanical splice coupler model for each:
 - 1.1. Bar size
 - 1.2. Bar deformation pattern
 - 1.3. Hoop diameter
2. 150 count, or fraction thereof, of CJP butt-welded splices or resistance-butt-welded splices for each:
 - 2.1. Bar size
 - 2.2. Hoop diameter

52-1.01C Submittals

52-1.01C(1) General

Reserved

52-1.01C(2) Shop Drawings

Not Used

52-1.01C(3) Certificates

Submit a certificate of compliance for each shipment of reinforcement.

If requested, submit the following:

1. Copy of the certified mill test report for each heat and size of reinforcing steel showing physical and chemical analysis
2. 2 copies of a list of all reinforcement before starting reinforcement placement

52-1.01D Quality Assurance

Reserved

52-1.02 MATERIALS

52-1.02A General

Reserved

52-1.02B Bar Reinforcement

Reinforcing bars must be deformed bars complying with ASTM A706/A706M, Grade 60, except you may use:

1. Deformed bars complying with ASTM A615/A615M, Grade 60, in:
 - 1.1. Junction structures
 - 1.2. Sign and signal foundations
 - 1.3. Minor structures
 - 1.4. Concrete crib members

- 1.5. Mechanically-stabilized-embankment concrete panels
- 1.6. Masonry block sound walls
2. Deformed or plain bars complying with ASTM A615/A615M, Grade 40 or 60, in:
 - 2.1. Slope and channel paving
 - 2.2. Concrete barriers Type 50 and 60
3. Plain bars for spiral or hoop reinforcement in structures and concrete piles

You may substitute welded wire reinforcement for reinforcing bars in the following:

1. Slope paving and lined ditches
2. Retaining walls
3. Concrete barriers
4. Sidewalks, curbs, and gutters on structures
5. Nonstructural aesthetic additions
6. Culvert headwalls, end walls, and wing walls
7. Shotcrete
8. Deck overlays
9. Shear reinforcement stirrups in PC girders

Substituted welded wire reinforcement must be on an equivalent area basis. The Engineer determines the exact location. If the welded wire reinforcement does not provide the required area of steel, supplement it with reinforcing bars.

52-1.02C Welded Wire Reinforcement

Welded wire reinforcement must comply with ASTM A1064/A1064M.

52-1.02D Reinforcing Wire

Reinforcing wire must comply with the specifications for plain wire in ASTM A1064/A1064M.

52-1.02E Dowels

Reinforcing steel dowels must be deformed bars complying with section 52-1.02B.

Threaded rods used as dowels must comply with section 75-1.02A.

52-1.03 CONSTRUCTION

52-1.03A General

Reserved

52-1.03B Cleaning

Before concrete is placed, the reinforcement to be embedded must be free of mortar, oil, dirt, excessive mill scale and scabby rust, and other coatings that would destroy or reduce the bond.

52-1.03C Bending

Do not bend or straighten bars in a way that damages the material. Do not use bars with kinks or improper bends.

Hooks and bends must comply with the *Building Code Requirements for Structural Concrete* published by ACI.

52-1.03D Placing

Firmly and securely hold reinforcement in position by:

1. Wiring at intersections and splices.
2. Using precast mortar blocks or ferrous metal chairs, spacers, metal hangers, supporting wires, or other authorized devices of sufficient strength to resist crushing under applied loads. Do not use aluminum, plastic, or wood supports.

Do not place bars on layers of fresh concrete as the work progresses.

Metal supports must have a clear cover of at least 1 inch. Do not consider protective coatings on metal supports when determining clear cover. Where the clear cover to reinforcement shown or determined by the Engineer exceeds the minimum specified clear cover, increase the clear cover for metal supports accordingly.

The center-to-center spacing of parallel bars must be at least 2.5 times the bar diameter.

The clear distance between bundles of bars and adjacent bundles or single bars must be at least:

1. 1.5 times the maximum size of the coarse aggregate
2. 2 times the larger bar diameter for 2-bar bundles
3. 2.5 times the larger bar diameter for 3-bar bundles

Tie bundle bars together at not more than 6-foot centers.

Unless otherwise shown, reinforcement must have a 2-inch clear cover measured from the surface of the concrete to the outside of the reinforcement.

Adjust or relocate reinforcement in post-tensioned concrete during the installation of prestressing ducts or tendons as required to provide described clearances to the prestressing tendons, anchorages, jacks, and equipment. Obtain authorization for any adjustments or relocations.

End each unit of spiral reinforcement at both ends by lapping the spiral reinforcement on itself for at least 80 diameters followed by (1) a 135-degree hook with a 6-inch tail hooked around an intersecting longitudinal bar or (2) a mechanical lap splice coupler. Discontinuities in spiral reinforcement may be made only where shown or authorized. The spiral on each side of a discontinuity or a lap splice is a separate unit. Where discontinuities in spiral reinforcement are not allowed, splice the spiral reinforcement. Lap splices in spiral reinforcement must be lapped at least 80 diameters followed by (1) a 135-degree hook with a 6-inch tail hooked around an intersecting longitudinal bar or (2) a mechanical lap splice coupler.

Roll welded wire reinforcement flat before placing concrete. Secure welded wire reinforcement in place with devices that prevent the reinforcement's vertical and transverse movement.

Do not tack weld on reinforcing bars unless shown.

For column and pile bar reinforcing cages measuring 4 feet in diameter and larger:

1. Tie all reinforcement intersections with double wire ties on at least 4 vertical bars of each cage equally spaced around the circumference.
2. Tie at least 25 percent of remaining reinforcement intersections in each cage with single wire ties. Stagger tied intersections from adjacent ties.
3. Provide bracing to avoid collapse of the cage during assembly, transportation, and installation.

52-1.04 PAYMENT

The payment quantity of bar reinforcing steel is the calculated weight of the reinforcing bars and wire.

The payment quantity of bar reinforcing steel includes the lap of bars for lap splicing, including locations where you use a continuous bar instead of the splice shown.

The payment quantities are based on the following:

Bar Reinforcing Steel Quantities

Deformed bar designation no.	Weight (pounds per foot)	Nominal diameter (inches)
3	0.376	0.375
4	0.668	0.500
5	1.043	0.625
6	1.502	0.750
7	2.044	0.875
8	2.670	1.000
9	3.400	1.128
10	4.303	1.270
11	5.313	1.410
14	7.650	1.693
18	13.600	2.257

NOTE: Bar numbers approximate the number of eighths of an inch included in the nominal diameter of the bars. The nominal diameter of a deformed bar is equal to the diameter of a plain round bar having the same weight per linear foot as the deformed bar.

The cross sectional area of reinforcing wire, in hundredths of square inches, is equal to its W-size number. The density of reinforcing wire is 0.2833 lb/cu in.

The payment quantity of welded wire reinforcement is determined based on the measured area covered by the reinforcement and does not include laps.

The payment quantity for bar reinforcing steel (bridge) includes diaphragm dowels and bolts in PC concrete members.

If alternative transverse deck reinforcement placement details are shown, the payment quantities are based on the detail that shows truss bars.

Bar reinforcing steel involved in bridge work is paid for as bar reinforcing steel (bridge) or bar reinforcing steel (epoxy coated)(bridge) unless it is included in a separate bid item.

52-2 EPOXY-COATED REINFORCEMENT AND EPOXY-COATED PREFABRICATED REINFORCEMENT

Not Used

52-3 GALVANIZED BAR REINFORCEMENT

Not Used

52-4 RESERVED

52-5 HEADED BAR REINFORCEMENT

Not Used

52-6 SPLICING

52-6.01 GENERAL

52-6.01A Summary

Section 52-6 includes specifications for splicing bar reinforcement.

Reinforcing bar splices consist of lap splices, service splices, or ultimate butt splices.

52-6.01B Definitions

group: Set of 5 or fewer consecutive lots after the 1st lot.

52-6.01C Submittals

Not Used

52-6.01D Quality Assurance

Not Used

52-6.02 MATERIALS**52-6.02A General**

Reserved

52-6.02B Service Splices and Ultimate Butt Splices

Not Used

52-6.03 CONSTRUCTION**52-6.03A General**

Butt-welded or mechanical splices not shown as requiring a service splice or an ultimate butt splice must comply with the specifications for service splices.

Do not place splices at a location shown as a no-splice zone.

Reinforcing bars may be continuous where splices are shown. If splice locations are not shown, determine splice locations using commercial lengths where practicable.

Unless another option is shown, stagger splices in adjacent reinforcing steel. The minimum distance between staggered lap splices or staggered mechanical lap splices must be the same as the length specified for a lap splice in the largest bar. The minimum distance between staggered butt splices must be 2 feet measured between the splice midpoints along a line centered between the axis of the adjacent bars.

For reinforcing bars where splice test samples were removed, replace either of the following:

1. Removed portion of the bar or hoop using mechanical ultimate butt splices
2. Bar or hoop in kind

52-6.03B Lap Splicing

Splices made by lapping must consist of placing reinforcing bars in contact and wiring them together while maintaining the alignment of the bars and the minimum clearances.

Do not splice the following by lapping:

1. No. 14 bars
2. No. 18 bars
3. Hoops
4. Reinforcing bars where you cannot provide a minimum clear distance of 2 inches between the splice and the nearest adjacent bar

For uncoated and galvanized reinforcing bars complying with ASTM A615/A615M, Grade 60, ASTM A706/A706M, or ASTM A767/A767M, Class 1, the length of lap splices must be at least:

1. 45 diameters of the smaller bar spliced for reinforcing bars no. 8 or smaller
2. 60 diameters of the smaller bar spliced for reinforcing bars nos. 9, 10, and 11

For epoxy-coated reinforcing bars and alternatives to epoxy-coated reinforcing bars complying with ASTM A775/A775M, ASTM A934/A934M, ASTM A1035/A1035M, or ASTM A1055/A1055M, the length of lap splices must be at least:

1. 65 diameters of the smaller bar spliced for reinforcing bars no. 8 or smaller
2. 85 diameters of the smaller bar spliced for reinforcing bars nos. 9, 10, and 11

SECTION 52

REINFORCEMENT

For reinforcing bars complying with ASTM A615/A615M, Grade 40, the length of lap splices must be at least:

1. 30 diameters of the smaller bar spliced for reinforcing bars no. 8 or smaller
2. 45 diameters of the smaller bar spliced for reinforcing bars nos. 9, 10, and 11

For splices in bundled bars, the length of the lap splices must be:

1. Equal to the length of a single bar lap splice for bundles of 2 bars
2. 1.2 times the length of a single bar lap splice for bundles of 3 bars

Lap welded wire reinforcement such that the overlap between the outermost cross wires is at least the larger of the following:

1. 6 inches
2. Spacing of the cross wires plus 2 inches
3. Numerical value of the longitudinal wire size (W-size number) times 4.3 divided by the spacing of the longitudinal wires in inches

52-6.03C Service Splices and Ultimate Butt Splices

Not Used

52-6.04 PAYMENT

Not Used

52-7 STRAY CURRENT PROTECTION

52-7.01 GENERAL

52-7.01A Summary

Section 52-7 includes specifications for installing stray current protection.

Stray current protection consists of one or a combination of the following:

1. Prestressing tendon connections
2. Bar reinforcing steel connections
3. Copper cable to bar reinforcing steel connections
4. Pile and concrete epoxy insulation
5. Concrete insulation course
6. Neoprene sheet insulation
7. Joint sealant insulation
8. Membrane insulation
9. Mortar block insulation
10. Epoxy-coated reinforcing steel insulation
11. Plastic end cover insulators
12. Pipe wrapping tape insulation
13. Epoxy for insulation of embedded metal materials

52-7.01B Definitions

Reserved

52-7.01C Submittals

Reserved

52-7.01D Quality Assurance

52-7.01D(1) General

Reserved

52-7.01D(2) Prestressing Tendon Connection

Welding operators must be prequalified by satisfactorily completing a field qualification test weld. The operator must make qualification test welds in the presence of the Engineer using:

1. Materials similar to those in the work
2. The same position and under the same conditions of welding that will be encountered in the work

Visual inspection of completed welds must show no evidence of cracks, lack of fusion, or undercutting.

52-7.01D(3)–52-7.01D(5) Reserved**52-7.02 MATERIALS****52-7.02A General**

Reserved

52-7.02B Prestressing Tendon Connection

For prestressing tendon connections, the no. 6 steel wire must comply with ASTM A1064, A510, or A510M.

52-7.02C Bar Reinforcing Steel Connection

Reserved

52-7.02D Copper Cable to Bar Reinforcing Steel Connection

Materials for exothermic welding the copper cable to bar reinforcing steel connections must comply with the manufacturer's instructions for the following:

1. Mold size and shape
2. Powder charge size and alloy mixture

Copper cable must comply with section 86.

Tape must be commercially available vinyl electrical tape with a thickness of at least 7 mils.

Test box cover and anchorage devices must comply with section 75-3. The gasket must be made of commercially available neoprene.

52-7.02E Pile and Concrete Epoxy Insulation

For pile and concrete epoxy insulation, epoxy must be:

1. Commercial quality
2. Nonconductive
3. Suitable for adherence to concrete and steel surfaces

52-7.02F Concrete Insulation Course

Concrete insulation course must comply with section 51 and contain at least 590 pounds of cementitious material per cubic yard of concrete.

52-7.02G Neoprene Sheet Insulation

Fabricate neoprene sheet insulation from sheet neoprene complying with the specifications for neoprene in section 51-2.04.

The sheet must be at least 1/8 inch thick.

52-7.02H Joint Sealant Insulation

The joint sealant insulation must be a single-component, non-sag polyurethane sealant complying with ASTM C 920.

The primer and backing rod must comply with the joint sealant manufacturer's instructions.

52-7.02I Membrane Insulation

Membrane insulation must comply with the specifications for dampproofing or preformed membrane waterproofing in section 54.

52-7.02J Mortar Block Insulation

Mortar block insulation must contain at least 760 pounds of cementitious material per cubic yard. The blocks must be dense, homogeneous, and watertight.

52-7.02K Epoxy-Coated Reinforcing Steel Insulation

Epoxy-coated reinforcing steel insulation must comply with section 52-2.

If a coupling nut is used at an attachment between an approach slab and an abutment, the nut must be epoxy coated either before or after fabrication.

52-7.02L Plastic End Cover Insulators

The plastic end cover insulators must be of the type commercially available to protect workers from protruding reinforcing bars. Bond the covers to the reinforcing bars with commercially available epoxy that is compatible with the plastic covers.

52-7.02M Pipe Wrapping Tape Insulation

For pipe wrapping tape insulation, the tape must be pressure-sensitive PVC or polyethylene tape with a nominal thickness of 20 mils. Use a primer as instructed by the manufacturer of the tape.

52-7.02N Epoxy for Insulation of Embedded Metal Materials

For insulation of embedded metal materials, epoxy must be:

1. Commercial quality
2. Nonconductive
3. Suitable for adhering to metal surfaces

Instead of epoxy coating the hanger rods, you may use commercial quality neoprene bushings around the pipe at strap supports.

Instead of epoxy coating the metal parts of joint seal assemblies in contact with concrete, you may apply a heavy coat of bituminous paint.

52-7.03 CONSTRUCTION**52-7.03A General**

Reserved

52-7.03B Prestressing Tendon Connection

Do not perform welding on the prestressing anchorage devices. Do not perform arc welding on the prestressing strand.

Connect the collector wire to the prestressing strand by gas welding. Do not gas weld until the tendons are grouted and have cured for at least 24 hours. You may join 2 wire pigtail ends by gas welding at any stage of the work.

Oxyacetylene welding must comply with the best standards of the industry. Use gas welding rods complying with Class RG45 (steel rods).

52-7.03C Bar Reinforcing Steel Connection

Weld bars and splices by the manual shielded metal-arc process before installing any prestressing strands. Use low-hydrogen electrodes complying with the specifications for E7016 electrodes in AWS A5.1/A5.1M.

52-7.03D Copper Cable to Bar Reinforcing Steel Connection

Fusion weld the copper cable to the bar reinforcing steel by an exothermic type welding process.

Apply commercially available rubber splicing compound to the welded connection.

Apply 2 layers of tape, each half lapped.

52-7.03E Pile and Concrete Epoxy Insulation

Abrasive blast clean concrete surfaces on which epoxy insulation is to be applied to the extent that clean aggregate is exposed.

Apply the epoxy by brush or other means that will completely and uniformly cover the surfaces.

Remove lifting anchors as specified for their removal in a corrosive environment in section 49-2.04B(2).

52-7.03F Concrete Insulation Course

Excavate and backfill for concrete insulation course under section 19-3.

The joint between the concrete insulation course and the footing must comply with the specifications for horizontal construction joints in section 51-1.03D(4), except abrasive blast cleaning is not required.

52-7.03G Neoprene Sheet Insulation

For neoprene sheet insulation, lap each successive sheet securely to the preceding sheet by at least 6 inches.

52-7.03H Joint Sealant Insulation

Abrasive blast clean and prime concrete surfaces to receive joint sealant insulation.

52-7.03I Membrane Insulation

The exposed surfaces of membrane insulation must be of uniform height above ground without unsightly bulges, depressions, or other imperfections.

Membrane insulation must comply with the specifications for dampproofing or preformed membrane waterproofing in section 54.

52-7.03J Mortar Block Insulation

Reserved

52-7.03K Epoxy-Coated Reinforcing Steel Insulation

For a coupling nut which is epoxy coated after fabrication, apply the epoxy by brush or other means that will completely and uniformly cover the surfaces in contact with concrete.

52-7.03L Plastic End Cover Insulators

Use enough epoxy to ensure that no voids exist between the plastic end cover insulators and the reinforcing bars.

52-7.03M Pipe Wrapping Tape Insulation

For pipe wrapping tape insulation, apply 1 layer of tape half lapped.

52-7.03N Epoxy for Insulation of Embedded Metal Materials

For embedded metals insulated with epoxy:

1. Prepare galvanized surfaces under section 59-3.03.
2. Apply the epoxy by brush or other means to completely and uniformly cover the surfaces in contact with concrete.

52-7.04 PAYMENT

Not Used

Replace section 56 with:

56 OVERHEAD SIGN STRUCTURES, STANDARDS, AND POLES

56-1 GENERAL

56-1.01 GENERAL

56-1.01A Summary

Section 56-1 includes general specifications for constructing overhead sign structures, standards, and poles.

56-1.01B Definitions

Reserved

56-1.01C Submittals

Reserved

56-1.01D Quality Assurance

56-1.01D(1) General

Reserved

56-1.01D(2) Quality Control

56-1.01D(2)(a) General

Reserved

56-1.01D(2)(b) Nondestructive Testing

56-1.01D(2)(b)(i) General

Perform NDT of steel members under AWS D1.1 and the requirements shown in the following table:

Nondestructive Testing for Steel Standards and Poles

Weld location	Weld type	Minimum required NDT
Circumferential splices around the perimeter of tubular sections, poles, and arms	CJP groove weld with backing ring	100% UT or RT
Longitudinal seam	CJP or PJP groove weld	Random 25% MT
Longitudinal seam within 6 inches of a circumferential splice	CJP groove weld	100% UT or RT
Welds attaching base plates, flange plates, pole plates, or mast arm plates to poles or arm tubes	CJP groove weld with backing ring and reinforcing fillet	$t \geq 5/16$ inch: 100% UT and 100% MT $t < 5/16$ inch: 100% MT after root weld pass and final weld pass
	External (top) fillet weld for socket-type connections	100% MT
Hand holes and other appurtenances	Fillet and PJP welds	MT full length on random 25% of all standards and poles

NOTE: t = pole or arm thickness

Nondestructive Testing for Overhead Sign Structures

Weld location	Weld type	Minimum required NDT
Base plate to post	CJP groove weld with backing ring and reinforcing fillet	100% UT and 100% MT
Base plate to gusset plate	CJP groove weld	100% UT
Circumferential splices of pipe or tubular sections	CJP groove weld with backing ring	100% UT or RT
Split post filler plate welds	CJP groove weld with backing bar	100% UT or RT
Longitudinal seam weld for pipe posts	CJP groove weld	t < 1/4 inch: 100% MT t ≥ 1/4 inch: 100% UT or RT
	PJP groove weld	Random 25% RT
Chord angle splice weld	CJP groove weld with backing bar	100% UT or RT
Truss vertical, diagonal, and wind angles to chord angles	Fillet weld	Random 25% MT
Upper junction plate to chord (cantilever type truss)	Fillet weld	Random 25% MT
Bolted field splice plates (tubular frame type)	CJP groove weld	100% UT and 100% MT
Cross beam connection plates (lightweight extinguishable message sign)	Fillet weld	Random 25% MT
Arm connection angles (lightweight extinguishable message sign)	Fillet weld	100% MT
Mast arm to arm plate (lightweight extinguishable message sign)	CJP groove weld with backing ring	t ≥ 5/16 inch: 100% UT and 100% MT t < 5/16 inch: 100% MT after root weld pass and final weld pass
Post angle to post (lightweight extinguishable message sign)	Fillet weld	100% MT
Hand holes and other appurtenances	Fillet and PJP welds	MT full length on random 25% of all sign structures

NOTE: t = pole or arm thickness

56-1.01D(2)(b)(ii) Ultrasonic Testing

For UT of welded joints with any members less than 5/16 inch thick or tubular sections less than 13 inches in diameter, the acceptance and repair criteria must comply with Clause 9.27.1 of AWS D1.1.

For UT of other welded joints, the acceptance and repair criteria must comply with Table 6.3 of AWS D1.1 for cyclically loaded nontubular connections.

After galvanization, perform additional inspection for toe cracks along the full length of all CJP groove welds at tube-to-transverse plate connections using UT.

When performing UT, use an authorized procedure under AWS D1.1, Annex S.

56-1.01D(2)(b)(iii) Radiographic Testing

The acceptance criteria for radiographic or real time image testing must comply with AWS D1.1 for tensile stress welds.

56-1.01D(2)(b)(iv) Longitudinal Seam Welds

The Engineer selects the random locations for NDT.

Grind the cover pass smooth at the locations to be tested.

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If repairs are required in a portion of a tested weld, perform NDT on the repaired portion and on 25 percent of the untested portions of the weld. If more repairs are required, perform NDT on the entire weld.

56-1.01D(3) Agency Acceptance

Reserved

56-1.02 MATERIALS

Reserved

56-1.03 CONSTRUCTION

Welding of steel members must comply with AWS D1.1.

Dispose of surplus excavated material.

Backfill under section 19-3.

56-1.04 PAYMENT

Not Used

56-2 OVERHEAD SIGN STRUCTURES

Not Used

56-3 STANDARDS, POLES, PEDESTALS, AND POSTS

56-3.01 GENERAL

56-3.01A General

Section 56-3 includes general specifications for fabricating and installing standards, poles, pedestals, and posts.

56-3.01B Materials

56-3.01B(1) General

Reserved

56-3.01B(2) Fabrication

56-3.01B(2)(a) General

Configure each mast arm ~~as a smooth curving arm with no apparent corners or angle points along the profile. The mast arm must have a rising straight section from the mast arm base plate at the pole, a constant radius curved section, followed by a straight horizontal section projected to the required length.~~

The two straight sections of the mast arm must connect to the ends of the constant radius section as a smooth and tangential extension to the constant radius section. The length of these three sections must not vary more than two inches for identical arms regardless of tenon spacing.

The mast arm rise (vertical distance from the pole base plate to the outboard end of the straight horizontal section) must not vary more than three inches for identical arms when loaded as shown.

All mast arms must be tip tenon on end and include sign rails and fasteners when signs are shown.

~~You may change the mast arm configuration if the mounting height and stability are maintained.~~

56-3.01B(2)(b) Bonding Jumper

Standards with handholes must comply with the following:

1. Include a UL-listed lug and 3/16-inch or larger brass or bronze bolt for attaching the bonding jumper for non-slip-base standards.
2. Attach a UL-listed lug to the bottom slip base plate with a 3/16-inch or larger brass or bronze bolt for attaching the bonding jumper for slip-base standards.

56-3.01C Construction**56-3.01C(1) General**

All mast arms (regardless of tenon spacing) at the outboard end of the horizontal section, when standing and loaded, with the pole completely vertical in all side planes (not raked or leaning) must be:

1. 0 degrees of negative horizontal (down)
2. No more than 2 degrees of positive horizontal (up)
3. Unreliant on wedges or shims to be within tolerance

Holes left in the shaft of an existing standard due to the removal of equipment or mast arm must be sealed by fastening a galvanized steel disk to cover the hole. Fasten using a single central galvanized steel fastener. Seal edges of the disk and hole with a polysulfide or polyurethane sealing compound complying with ASTM C 920, Type S, Grade NS, Class 25, Use O.

If an existing standard is ordered to be relocated or reused, remove large dents, straighten shafts, and replace parts that are in poor condition. Furnish anchor bolts or bars and nuts required for relocating or reusing standard. Repair and replacement work is change order work.

If a standard or mast arm is relocated or the Agency furnishes a used standard or mast arm, furnish:

1. New bolts, nuts, cap screws, and washers
2. New keeper plate, if the standard has a slip base

56-3.01C(2) Foundations**56-3.01C(2)(a) General**

Except for concrete for CIDH concrete pile foundations, concrete must comply with the specifications for minor concrete.

Construct concrete foundations on firm ground.

After each standard, pole, pedestal, and post is properly positioned, place mortar under the base plate. Finish the exposed portion to present a neat appearance. Mortar must comply with the specifications for mortar in section 51-1, except mortar must have:

1. 1 part by volume of cement
2. 3 parts by volume of clean sand

Form exposed portions of the foundation to present a neat appearance and true to line and grade. The top of the foundation at curbs or sidewalks must be finished to curb or sidewalk grade. Forms must be rigid and braced securely in place. Conduit ends and anchor bolts must be placed at the proper height and position. Anchor bolts must be installed a maximum of 1:40 from vertical and held in place by rigid top and bottom templates. Use a steel bottom template at least 1/2 inch thick that provides proper spacing and alignment of anchor bolts near the embedded bottom end. Install the bottom template before placing footing concrete.

For relocated standards, construct new foundations and furnish anchor bolts of the proper type and size.

Galvanize steel parts under section 75-1.02B.

Provide 2 nuts and washers for the upper threaded part of each anchor bolt. Provide 3 nuts and washers for each anchor bar or stud.

Do not weld HS steel used for anchor bolts, anchor bars, or studs.

Before placing concrete, moisten the forms and ground. Keep the forms in place until the concrete sets for at least 24 hours and is strong enough to prevent damage to the surface.

Except when located on a structure, construct foundations monolithically.

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Apply ordinary surface finish under section 51-1.03F(2).

If a foundation must be extended for additional depth, the extension work is change order work.

Do not erect standards, poles, pedestals, or posts until the concrete foundation has cured for at least 7 days.

The Engineer selects either the plumbing or raking technique for standards, poles, pedestals, and posts. Plumb or rake by adjusting the leveling nuts before tightening nuts. Do not use shims or similar devices. After final adjustments of both top nuts and leveling nuts on anchorage assemblies have been made and each standard, pole, pedestal, and post on the structure is properly positioned, tighten nuts as follows:

1. Tighten leveling nuts and top nuts, following a crisscross pattern, until bearing surfaces of all nuts, washers, and base plates are in firm contact.
2. Use an indelible marker to mark the top nuts and base plate with lines showing relative alignment of the nut to the base plate.
3. Tighten top nuts following a crisscross pattern:
 - 3.1. Additional 1/6 turn for anchor bolts greater than 1-1/2 inches in diameter.
 - 3.2. Additional 1/3 turn for other anchor bolts.
 - 3.3. Tightening tolerance for all top nuts is $\pm 1/8$ turn.

In unpaved areas, construct a raised concrete pad in front of each controller cabinet pedestal.

If a foundation is shown to be abandoned, remove the top of the foundation, anchor bolts, and conduits to a minimum depth of 0.5 foot below the sidewalk surface or original ground. Backfill the resulting hole with material equivalent to the surrounding material.

A foundation must be completely removed if not shown to be reused or abandoned.

Dispose of foundations that are removed.

56-3.01C(2)(b) Cast-In-Drilled-Hole Concrete Pile Foundations

Reinforced CIDH concrete pile foundation must comply with section 49-3 except:

1. Dispose of material resulting from drilling holes
2. Concrete for CIDH concrete piles will not be considered as designated by compressive strength

Concrete must contain not less than 590 pounds of cementitious material per cubic yard.

For standards and poles located in sidewalk areas, the pile foundation must be placed to final sidewalk grade before the sidewalk is placed. The top 4 inches must be square shaped.

If shown, use sleeve nuts on Type 1 standards. The bottom of the base plate must be flush with the finished grade.

Spiral reinforcement must be continuous above the bottom of the anchor bolts. The top termination must be either:

1. 1'-6" lap beyond the end of pitch with a 90-degree hook extending to the opposite side of the cage, or
2. 1'-6" lap beyond the end of pitch with 2 evenly spaced authorized mechanical couplers

56-3.01C(3) Identification Tags

Except for Type 1 standards and wood poles, attach rectangular corrosion-resistant metal identification tags on all standards and poles using stainless steel rivets as follows:

1. For standards and poles, attach a tag above the handhole near the base of the standard or pole.
2. For signal standards, attach 1 tag above the handhole near the base of the pole and 1 tag on the underside of the signal mast arm near the arm plate.

The lettering on each identification tag must be:

1. Either depressed or raised

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SECTION 56

OVERHEAD SIGN STRUCTURES, STANDARDS, AND POLES

2. 1/4 inch tall
3. Legible
4. Readable after the support structure is coated and installed

Include the following information on the tag:

1. Name of the manufacturer
2. Date of manufacture
3. Identification number
4. Contract number
5. Unique identification code:
 - 5.1. Assigned by the manufacturer
 - 5.2. Traceable to a particular Contract and the welds on that component

56-3.01D Payment

Not Used

56-3.02 STEEL STANDARDS, POLES, PEDESTALS, AND POSTS

56-3.02A General

56-3.02A(1) General

Section 56-3.02 includes specifications for fabricating and installing steel standards, poles, pedestals, and posts.

56-3.02A(2) Definitions

Reserved

56-3.02A(3) Submittals

56-3.02A(3)(a) General

The Engineer selects random samples of fastener components from each production lot. The Engineer determines sample sizes for each fastener component. Submit selected sample fasteners to METS for QA testing. Include test reports specified in ASTM with the test sample submittal.

56-3.02A(3)(b) Test Reports

For standards and poles with shaft lengths of 15 feet or more, submit certified test reports verifying compliance with minimum yield strength requirements. Test reports may be the mill test report for the as-received steel. If the as-received steel has a lower yield strength than required, provide test data assuring that your method of cold forming will consistently increase the steel tensile properties to meet the specified minimum yield strength. Test data must include tensile properties of the steel after cold forming for specific heats and thicknesses.

56-3.02A(4) Quality Assurance

56-3.02A(4)(a) General

Reserved

56-3.02A(4)(b) Quality Control

For cast slip bases for standards and poles with shaft lengths of 15 feet or more, perform RT on 1 casting from each lot of a maximum of 50 castings under ASTM E94. Castings must comply with the acceptance criteria for severity level 3 or better for the types and categories of discontinuities specified in ASTM E186 and E446. If the casting fails testing, 2 additional castings must be radiographed. If the 2 additional castings fail the inspection, the lot is rejected.

56-3.02A(4)(c) Agency Acceptance

Reserved

56-3.02B Materials**56-3.02B(1) General**

Type 1 standards and steel pedestals for controller cabinets must be manufactured of one of the following:

1. At least 0.120-inch-thick galvanized steel
2. 4-inch standard weight galvanized steel pipe complying with ASTM A53/A53M
3. 4-inch Type 1 conduit with the top designed for post-top slip fitter

Material for push button posts, pedestrian barricades, and guard posts must comply with ASTM A53/A53M or ASTM A500/A500M.

Handhole reinforcement rings must be continuous around the handholes.

Galvanize standards, poles, pedestals, posts, fasteners, and other ferrous materials under section 75-1.02B.

Steel pipe standards and mast arms must be hot dip galvanized after manufacturing. Remove spikes from galvanized surfaces.

56-3.02B(2) Bolted Connections

Anchor bolts must comply with ASTM F1554, Grade 55 for weldable steel.

HS anchor bolts, nuts, and washers must comply with section 55-1.02D(1) and the following:

1. Bolt threads must be rolled
2. Hardness of HS anchor bolts must not exceed 34 HRC when tested under ASTM F606
3. Galvanization must be by mechanical deposition
4. Nuts must be heavy-hex type
5. Each lot of nuts must be proof load tested

Bolts, nuts, and washers for general applications must comply with section 55-1.02D(1).

HS bolts shown to be snug tight must comply with section 55-1.02D(1) for general applications.

HS bolts, nuts, and flat washers used to connect slip base plates must comply with the requirements for HS fastener assemblies for use in structural steel joints in section 55-1.02D(1) except rotational capacity testing and tension testing are not required.

Zinc-coated nuts used on fastener assemblies having a specified preload obtained by specifying a prescribed tension, torque value, or degree of turn must be provided with a colored lubricant that is clean and dry to the touch. The lubricant color must contrast the zinc coating color on the nut such that the presence of the lubricant is visually obvious. The lubricant must be insoluble in water or the fastener components must be shipped to the job site in a sealed container.

Plate washers must be manufactured by saw cutting and drilling steel plate. Steel plate must comply with AISI 1018. Before galvanizing, remove burrs and sharp edges and chamfer both sides of holes to allow the bolt head to make full contact with the washer without tension.

HS cap screws for attaching arms to standards must comply with ASTM F3125 Grade A325 or ASTM A449, and the mechanical requirements in Grade A325 after galvanizing. Coat threads of cap screws with a colored lubricant that is clean and dry to the touch. The lubricant color must contrast the zinc coating color on the cap screw such that the presence of the lubricant is visually obvious. The lubricant must be insoluble in water or the fastener components must be shipped to the job site in a sealed container.

Before manufacturing, details must be adjusted to ensure that cap screw heads can be turned using conventional installation tools. During manufacturing, properly locate the position of the luminaire arm on the arm plate to avoid interference with the cap screw heads.

SECTION 56

OVERHEAD SIGN STRUCTURES, STANDARDS, AND POLES

56-3.02B(3) Standards and Poles

56-3.02B(3)(a) General

Standards and poles with shaft lengths of 15 feet or more must comply with sections 55-1.02 and 56-3.02B(3).

Tapered tubes must be manufactured from sheet steel of a weldable grade having a minimum yield strength of 55,000 psi after manufacturing.

Steel having a nominal thickness greater than 2 inches that is used for tube-to-transverse plate connections must have a minimum CVN impact value of 20 ft-lb at 20 degrees F when tested under ASTM E23.

56-3.02B(3)(b) Fabrication

When a single-ply 5/16-inch-thick pole is specified, a 2-ply pole with equivalent section modulus may be substituted.

Standards may be manufactured of full-length sheets or shorter sections. Each section must be manufactured from 1 or 2 pieces of sheet steel. If 2 pieces are used, the longitudinal welded seams must be directly opposite from one another. If the sections are butt-welded together, the longitudinal welded seams of adjacent sections must be placed to form continuous straight seams from the base to the top of the standard.

Standards with an outside diameter of 12 inches or less must be round. Standards with an outside diameter greater than 12 inches may be round or multi-sided. Multi-sided standards must:

1. Be convex
2. Have a minimum of 12 sides
3. Have a minimum bend radius of 4 inches

Manufacture mast arms from material specified for the standard.

Standards and poles must be straight with a maximum variation of:

1. 1 inch measured at the midpoint of a 30- to 35-foot standard
2. 3/4 inch measured at the midpoint of a 17- to 20-foot standard

Exposed edges of the plates that make up the base assembly must be finished smooth. Exposed corners of the plates must be broken. Provide shafts with slip-fitter shaft caps.

Surface flatness requirements specified in ASTM A6/A6M apply to plates meeting one or more of the following:

1. In contact with concrete, grout, or washers and leveling nuts
2. In HS bolted connections
3. In joints where cap screws are used to secure luminaire and signal arms
4. Used for breakaway slip base assemblies

Do not make additional holes in structural members.

Manufacture the cast steel option for slip bases from material of Grade 70-40 complying with ASTM A27/A27M. You may use other comparable material if authorized. Casting tolerances must comply with the Steel Founders' Society of America's recommendations for green sand molding.

56-3.02B(3)(c) Welding

Butt-welded circumferential joints of tubular sections requiring CJP groove welds must be made using a metal sleeve backing ring inside each joint. The sleeve must have at least a 1/8-inch nominal thickness and be manufactured from steel having the same chemical composition as the steel in the tubular sections to be joined. If the sections to be joined have different specified minimum yield strengths, the sleeve must have the same chemical composition as the tubular section having the higher minimum yield strength. The width of the metal sleeve must be consistent with the type of NDT selected and must be a

SECTION 56

OVERHEAD SIGN STRUCTURES, STANDARDS, AND POLES

minimum width of 1 inch. At fitting time, the sleeve must be centered at the joint and in contact with the tubular section at the point of the weld.

Welds must be continuous.

Weld metal at the transverse joints must extend to the sleeve, making the sleeve an integral part of the joint.

During manufacturing, longitudinal seams on vertical tubular members of cantilevered support structures must be within 90 degrees circumferentially of the center of the longest mast arm connection.

Longitudinal seams on horizontal tubular members, including signal and luminaire arms, must be within 45 degrees of the bottom of the arm.

Longitudinal seam welds in steel tubular sections may be made by the electric resistance welding process.

Longitudinal seam welds must have a 60 percent minimum penetration except:

1. Within 6 inches of a circumferential weld, the longitudinal seam weld must be a CJP groove weld.
2. Longitudinal seam welds on lighting support structures having a telescopic pole segment splice must be CJP groove welds on the female end for a length on each end equal to the designated slip-fit splice length plus 6 inches.

Except for fillet and fatigue-resistant welds, exposed circumferential welds must be ground flush with the base metal before galvanizing or painting. Ground flush is specified as -0, +0.08-inch.

Circumferential welds and base plate-to-pole welds may be repaired only 1 time.

The length of telescopic slip-fit splices must be at least 1.5 times the inside diameter of the exposed end of the female section.

For welds connecting reinforced handholes or box-type pole plate connections to a tubular member, the start and stop points must be at points located on a longitudinal axis of symmetry of the tube coinciding with the axis of symmetry of the hand hole or pole plate.

56-3.02C Construction

Assemble and tighten the slip base when the pole is on the ground. Threads of heavy hex nuts for each slip base bolt must be coated with additional lubricant that is clean and dry to the touch. Tighten HS slip base bolts to within ± 10 ft-lb of torque shown in the following table:

Slip Base Bolt Tightening Requirements	
Standard type	Torque (ft-lb)
15-SB	150
15-SBF	150
30	150
31	200

Bolted connections attaching signal or luminaire arms to standards, poles, and posts are considered slip critical. Galvanized faying surfaces of plates on luminaire arms, signal arms, and poles must (1) be roughened by hand using a wire brush before assembly and (2) comply with requirements for Class C surface conditions for slip-critical connections in *Specification for Structural Joints Using High-Strength Bolts* of the RCSC. Coatings for faying surfaces must comply with the RCSC specification for Class B coatings.

56-3.02D Payment

Not Used

56-3.03–56-3.04 RESERVED

56-3.05 HIGH MAST LIGHTING ASSEMBLY POLES

Not Used

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OVERHEAD SIGN STRUCTURES, STANDARDS, AND POLES

56-3.06 WOOD POLES

Not Used

56-4–56-10 RESERVED

Replace section 60 with:

60 EXISTING STRUCTURES

60-1 GENERAL

60-1.01 GENERAL

Section 60 includes specifications for performing work on existing structures.

Work performed on existing structures must comply with section 15.

60-1.02 MATERIALS

Not Used

60-1.03 CONSTRUCTION

Not Used

60-1.04 PAYMENT

Not Used

60-2 STRUCTURE REMOVAL

Not Used

60-3 STRUCTURE REHABILITATION

Not Used

60-4 MODIFYING STRUCTURES

60-4.01 GENERAL

60-4.01A General

Section 60-4 includes specifications for modifying structures.

60-4.01B Materials

Not Used

60-4.01C Construction

Not Used

60-4.01D Payment

Not Used

60-4.02 REFINISHING BRIDGE DECKS

Not Used

60-4.03 ACCESS OPENINGS

Not Used

60-4.04 CORING CONCRETE

Not Used

60-4.05 CORING AND PRESSURE GROUTING DOWELS

60-4.05A General

Section 60-4.05 includes specifications for coring holes through concrete and grouting dowels into the cored holes.

Coring must comply with section 60-4.04.

60-4.05B Materials

Grout must comply with ASTM C1107 or ASTM C845, Type K, with a compressive strength of 5,000 psi at 28 days when tested under California Test 551.

SECTION 60

EXISTING STRUCTURES

Dowels must comply with the specifications for bar reinforcing steel in section 52.

Water for grout must comply with the specifications for water in section 90-1.02D.

Admixtures must not contain more than 500 ppm of chlorides as Cl when tested under California Test 422 and not more than 2,500 ppm of sulfates as SO₄ when tested under California Test 417.

60-4.05C Construction

Clean loose and foreign material from concrete and steel surfaces that will be in contact with the grout. Flush holes with water and let them dry to a surface-dry condition immediately before grouting.

Seal the ends of holes after placing the dowels. Place a vent tube at one end of the hole and an injection feed tube at the other end of the hole. For holes with only a single end, place vent and injection feed tubes in the same end. Place tubes such that the air will vent and the hole will be completely filled with grout.

Mix grout under the manufacturer's instructions.

Pump grout into holes. Use sufficient pressure so that the hole is free of voids. Continually waste grout until air and water eject from the vent tubes and there are no visible slugs.

60-4.05D Payment

Payment for furnishing dowels is not included in the payment for core and pressure grout dowel.

60-4.06 STEEL COLUMN CASINGS

Not Used

60-4.07 COMPOSITE COLUMNS CASINGS

Not Used

60-4.08 PRESTRESSING STEEL GIRDERS

Not Used

60-4.09 BRIDGE JOINT RESTRAINERS

Not Used

60-5 ABANDONING STRUCTURES

Not Used

60-6–60-10 RESERVED

DIVISION VII DRAINAGE FACILITIES

Replace section 61 with:

61 GENERAL

61-1 GENERAL

61-1.01 GENERAL

Section 61 includes general specifications for constructing drainage facilities.

61-1.02 MATERIALS

Not Used

61-1.03 CONSTRUCTION

Not Used

61-1.04 PAYMENT

Not Used

61-2 CULVERT AND DRAINAGE PIPE JOINTS

61-2.01 GENERAL

61-2.01A Summary

Section 61-2 includes specifications for constructing joint systems and couplers for culverts and drainage pipes.

Joint systems and couplers for culverts and drainage pipes are classified as standard, positive, or down drain.

61-2.01B Definitions

shear strength: Required joint shear strength expressed as a percentage of the calculated pipe shear strength at a transverse section remote from the joint.

moment strength: Moment strength required of the joint expressed as a percentage of the calculated moment capacity of the pipe on a transverse section remote from the joint.

tensile strength: Resistance to the longitudinal force that tends to separate adjacent pipe sections.

integral joint overlap: Projection of 1 pipe barrel into another pipe barrel.

sleeve joint overlap: Minimum sleeve width required to engage abutted pipe barrels.

watertightness: Ability of a joint to hold water under pressure without leaking.

joint: Connection point for 2 or more pipe sections.

61-2.01C Submittals

For watertight joints, submit your analysis or test results performed on representative joints proposed for installation.

Submit a certificate of compliance for each classification of joint systems and couplers.

Where field leakage testing is shown for pipe systems, submit:

1. Proposed field leakage test procedure for each portion of each pipe system at least 15 days before you start testing. The submittal for each proposed field leakage test procedure must include:
 - 1.1. Type of test: exfiltration, low-pressure air, negative air pressure, or other authorized method
 - 1.2. Specific joints or pipe sections to be tested
 - 1.3. Maximum and minimum pressures or hydrostatic head to be applied
 - 1.4. Duration of tests from location to location
 - 1.5. Date and time of each test
 - 1.6. List of test equipment to be used

- 1.7. Date of last calibration if applicable
2. Leakage calculations for the exfiltration and infiltration tests
3. Repair procedure for joints or pipe sections that fail the field leakage test

61-2.01D Quality Assurance**61-2.01D(1) General**

Reserved

61-2.01D(2) Quality Control**61-2.01D(2)(a) Watertightness Test**

Perform watertightness tests of the assembled joints. The assembled joints must pass the tests without joint leakage.

The watertightness test must consist of testing the hydrostatic pressure on a joint by connecting 2 pipe sections under the manufacturer's instructions. Provide suitable bulkheads within the pipe adjacent to and on either side of the joint or at the outer ends of the joined pipe sections. Do not place mortar or concrete coating, filling, or packing in addition to that normally required for the joint before conducting the watertightness test. After the pipe sections are fitted together with the gasket or gaskets in place, subject the assembly to a 10-foot water pressure head above the pipe crown for 10 minutes. Moisture or beads of water appearing on the surface of the joint are not considered leakage. Perform the test on individual joints at the manufacturer's plant.

Test joint watertightness on pipe sections in straight alignment and on pipe sections deflected from straight alignment. When you test joints on pipe sections not in straight alignment, position the pipe sections to create a gap on one side of the outside pipe perimeter that is 1/2 inch wider than the gap for the pipe sections in straight alignment. If you use coupling bands to test the pipe sections not in straight alignment and the maximum gap on one side of the outside pipe perimeter is less than 1/2 inch wider than that for the pipe sections in straight alignment, position the coupling band and the pipe sections to provide the maximum gap.

61-2.01D(2)(b) Performance Specifications

For joint systems and couplers under section 61-2.01D(2)(b), determine the values for joint properties by mathematical analysis or an authorized test. Joint components subject to bending forces must not be stressed beyond the minimum specified yield strength of the material as determined by using the plastic section modulus.

Joint systems or couplers must:

1. Perform their intended function
2. Possess durability equivalent to that of the pipe
3. Comply with the quality characteristics shown in the following table:

Joint Classification Requirements

Quality characteristic	Requirement		
	Standard	Positive ^a	Downdrain ^b
Shear strength (min, %)	2	5	5
Moment strength (min, %)	0	15	15
Tensile strength			
6"–42" dia ^c (min, lb)	0	0	5,000
45"–84" dia ^c (min, lb)	0	0	10,000
Joint overlap ^d			
Integral			
12" and smaller dia ^e (min, in)	1/4	1/2	--
15"–33" dia ^e (min, in)	1/2	3/4	--
36" and larger dia ^e (min, in)	3/4	1	--
Sleeve width (min, in)	10-1/2	10-1/2	10-1/2
Watertightness	Where described	Where described	Required

^aPositive joints must comply with either (1) shear strength, moment strength, and joint overlap-sleeve properties, or (2) shear strength and joint overlap-integral characteristics.

^bJoints for downdrains have at least the specified values when tested with joints sealed to comply with the watertightness requirement.

^cLimits for corrugated metal pipe arch depend upon the equivalent diameter of circular pipe under AASHTO M 36 for corrugated steel pipe and AASHTO M 196 for corrugated aluminum pipe.

^dJoints designed to comply with required values by means other than joint overlap as shown in the table may be used if authorized.

^eInside diameter of circular pipes or inside horizontal dimension of oval or arch pipes.

61-2.01D(3) Field Leakage Testing

61-2.01D(3)(a) General

Perform field leakage testing on culverts and drainage structures wherever field leakage testing is shown.

Field leakage testing includes:

1. Cleaning and presoaking pipes
2. Installing and removing bulkheads or plugs necessary to perform tests
3. Removing and disposing of waste materials
4. Retesting
5. Repairing
6. Changing the drainage system to comply with specifications for field leakage testing

For pipe systems less than 1,500 feet in length, test all joints for leakage.

For pipe systems 1,500 feet or greater in length, test each pipe system for leakage at locations selected by the Engineer at a rate of:

1. 50 joints per 100 pipe joints for pipe systems less than 1 mile in length
2. 30 joints per 100 pipe joints for pipe systems from 1 mile to 3 miles in length
3. 20 joints per 100 pipe joints for pipe systems more than 3 miles in length

For every selected joint or section that fails leakage requirements, the Engineer may select up to 4 more joint locations or sections between joints for testing.

Clean the pipe and remove debris and sediment before you start testing.

Clean and test each pipe system and appurtenances by using the exfiltration, infiltration, low-pressure air, or negative air pressure method, except the Engineer must approve the use of the infiltration test if the groundwater table is low. You may test installed pipe joints using air or water under low pressure. Field leakage testing is conducted after backfilling.

Do not use your test equipment until it is authorized. The Engineer may require a calibration test of gauges or other instrumentation.

Use only 1 leak test method on a contiguous pipe system unless the pipe type or diameter changes in the same run.

Complete the cleaning and testing of each pipe system between inlets or ends within 20 days after backfilling for storm drain lines and structures.

Perform each test in the presence of the Engineer.

Prevent joints from separating during a test. Repair any damage resulting from the field leakage test.

Take corrective action and retest the line if the leakage exceeds the allowable quantity. Determine the leak source and repair or replace the defective pipe whenever an installed pipe system fails to comply with the requirements under the test method used.

The Engineer does not accept a pipe installation if it fails to pass the field leakage test.

Stop all obvious leaks even if the leakage is below the allowable quantity.

61-2.01D(3)(b) Exfiltration and Infiltration Testing

Exfiltration and infiltration tests must comply with ASTM C969 except:

1. You may fill the pipe with clear water to allow normal absorption into the pipe wall before performing the exfiltration leakage test. Start the leakage test within 72 hours after filling the pipe and complete the field leakage test within 24 hours thereafter. The test period must be at least 1 hour in duration. For plastic and metal pipe, the absorption period is not required.
2. Leakage must not be more than 1,000 gallons per inch of nominal pipe diameter per mile of pipe per day with a minimum test pressure of 6 feet of water column above the pipe crown at the upper end of the pipe or above the active groundwater table, whichever is higher. Limit the length of pipe you test such that the pressure on the invert of the lower end of the section does not exceed 20 feet of water column. Increase the allowable leakage by 8 percent for each increase in pressure of 1.5 feet above the basic 6-foot water column measured above the crown or at the lower end of the section.
3. Whenever a suitable head of groundwater exists above the pipe crown and if the pipe is large enough to work inside, the Engineer may accept the installed pipe on the basis of visible leakage repair during the infiltration leakage test.
4. Take into account all lateral or side storm drains included in the test section in computing the allowable leakage. Make an allowance of 0.2 gallons per hour per foot of head above the invert for each junction structure or drainage inlet included in the test section.

Storm drains, side storm drains, and fittings must be open, clean, and free draining upon final completion of the work.

61-2.01D(3)(c) Low-Pressure Air Test

You may use the low-pressure air test instead of the exfiltration test or the infiltration test for pipes 30 inches in nominal diameter or less. You may prewet the pipes. Test pipes from inlet to inlet or shorter lengths. Do not use the low-pressure air test for drainage pipes over 30 inches in nominal diameter regardless of the material type. If you use a low-pressure air test, perform the test immediately following pipe cleaning.

Brace plugs and bulkheads to prevent release during the low-pressure air test. Locate gauges, air piping manifolds, and valves above the ground. Do not allow anyone to enter a manhole or inlet of a plugged pipe when it is under pressure. Equip the air testing apparatus with a pressure release device, such as a rupture disk or a pressure relief valve, designed to relieve pressure in the pipe at 6 psi when under test.

Start the test after the pressure is stabilized at or above an internal pressure of 3.5 psi greater than the average back pressure of the groundwater that could submerge the pipe. Start recording the time when the internal pressure drops to 3.5 psi. The tested portion of the pipe passes the field leakage test when the pressure drop is less than 1 psi for the time period calculated for the size and length of the pipe to be tested as shown in the following table:

Minimum Test Time for Pressure Drop

Nominal pipe diameter (inches)	Time for pressure drop (minutes/100 feet)
6	0.7
8	1.2
10	1.5
12	1.8
15	2.1
18	2.4
21	3.0
24	3.6
27	4.2
30	4.8

61-2.01D(3)(d) Other Allowable Tests

If authorized, you may test:

1. Pipes over 27 inches in nominal diameter 1 joint at a time under ASTM C1103 instead of the exfiltration test specified in section 61-2.01D(3)(b).
2. Plastic pipe 30 inches or less in nominal diameter with the low-pressure air test specified in ASTM F1417.
3. Pipes 36 inches or less in nominal diameter with the negative 3.5 psi vacuum air pressure test specified in ASTM C1214 instead of the exfiltration test or low-pressure air test specified in section 61-2.01D(3)(b) and 61-2.01D(3)(c). The minimum test times for pressure drop for pipes:
 - 3.1. 30 inches in nominal diameter and smaller must be the same as the low-pressure air test specified in section 61-2.01D(3)(c)
 - 3.2. 33 inches in nominal diameter must be 5.4 minutes per 100 feet
 - 3.3. 36 inches in nominal diameter must be 6.0 minutes per 100 feet

61-2.01D(3)(e) Joints or Pipe Section Not Passing Leakage Testing

Identify joints or pipe sections that exceed the maximum allowable leakage after you complete field leakage testing. Repair and retest the failed joints or pipe sections until they comply with the test requirements.

Repair and retest the failed joints or pipe sections as specified in the repair procedures submitted under section 61-2.01C. If the same joint fails the leakage test a second time, remove and replace the pipe sections on either side of the joint with new pipes. Replace any pipe section that fails. Retest the replaced pipe section for leaks.

61-2.01D(3)(f) Reserved

61-2.02 MATERIALS

Resilient joint material must be a neoprene expanded rubber or sheet rubber gasket, "O" ring rubber gasket, butyl rubber base joint sealant, or other authorized resilient material.

All joints, including any connection, must be capable of transferring the required shear across the joint.

Watertightness must be attained by use of an authorized durable, high-quality, resilient joint material designed to perform the intended function.

61-2.03 CONSTRUCTION

Not Used

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61-2.04 PAYMENT

The payment quantity for field leakage testing:

1. Is the length of the pipe that has passed field leakage tests
2. Is measured:
 - 2.1. Along the invert of the pipe
 - 2.2. To the inside face of drainage inlets or similar structures that are within the length of the tested pipe
3. Includes the length through elbows, tees, and other fittings that have passed field leakage tests

61-3 ALTERNATIVE CULVERTS

Not Used

61-4 ALTERNATIVE SLOTTED PIPE**61-4.01 GENERAL**

Section 61-4 includes specifications for installing alternative slotted pipe.

Choose from the types of alternative slotted pipe shown. Do not mix different types of slotted pipe in the same installation.

Slotted plastic pipe must comply with section 64-3.

Slotted corrugated steel pipe must comply with the specifications for slotted corrugated steel pipe in section 66-2.

61-4.02 MATERIALS

Not Used

61-4.03 CONSTRUCTION

Not Used

61-4.04 PAYMENT

Not Used

61-5 CONCRETE BACKFILL FOR PIPE TRENCHES

Not Used

61-6 TEMPORARY CULVERTS

Not Used

61-7 TEMPORARY SLOTTED PIPE

Not Used

61-8–61-15 RESERVED

Replace section 64 with:

64 PLASTIC PIPE

64-1 GENERAL

64-1.01 GENERAL

64-1.01A Summary

Section 64-1 includes general specifications for fabricating and installing plastic pipe.

64-1.01B Definitions

Reserved

64-1.01C Submittals

Submit a certificate of compliance for plastic pipe, including the average pipe stiffness, resin material cell classification and date of manufacture.

64-1.01D Quality Assurance

Reserved

64-1.02 MATERIALS

Not Used

64-1.03 CONSTRUCTION

Not Used

64-1.04 PAYMENT

Not Used

64-2 PLASTIC PIPE

64-2.01 GENERAL

64-2.01A Summary

Section 64-2 includes specifications for fabricating and installing plastic pipe.

Installing plastic pipe includes excavation, backfill, connection of new pipe to new or existing facilities, reinforcement, concrete collars or tees, and other connecting devices.

64-2.01B Definitions

Reserved

64-2.01C Submittals

For corrugated polyethylene pipe, submit the manufacturer's copy of plant audits and test results from the National Transportation Product Evaluation Program for the current cycle of testing for each pipe diameter furnished.

64-2.01D Quality Assurance

Reserved

64-2.02 MATERIALS

64-2.02A General

Plastic pipe must be Type C or Type S corrugated polyethylene pipe or corrugated PVC pipe with smooth interior.

The residue from the ignition of HDPE and PVC compounds must not exceed 30 percent as determined under ASTM D2584 except the muffle furnace temperature must be 840 ± 45 degrees F.

Pipes and fittings must be homogenous throughout and uniform in color, opacity, density, and other properties. The inside and outside surfaces must be semimatte or glossy in appearance and free of chalky, sticky, or tacky material. The pipe walls must be free of cracks, holes, blisters, voids, foreign inclusions, or other defects affecting the pipe wall integrity or visible to the naked eye. Do not use pipes or

fittings with abrasions or scratches deeper than 10 percent of the wall thickness. The joint surfaces where the gaskets bear must be smooth and free of imperfections, ridges, fractures, or cracks that could adversely affect the joint seal.

Store pipes in unit packages and protect the bell end of the pipes from damage. Support unit packages with racks or dunnage to prevent damage and bending. If unit packages are stacked, do not allow the weight of the upper units to cause deformation to the pipes in the lower units. Do not store pipes adjacent to heat sources. Do not allow pipes to overhang vehicles or storage areas unsupported by more than 3 feet.

Cover pipes to provide temporary sun block protection. Provide adequate air circulation around the covered pipes to reduce excessive heat accumulation. Protect gaskets from exposure to weather, heat, ozone, oil, grease, and sunlight for any time period exceeding 48 hours. Do not store gaskets near electrical or exhaust heat sources.

The Agency rejects pipes with cracked or split gaskets.

Protect pipes and fittings from damage when handling and installing.

64-2.02B Backfill

Structure backfill material for plastic pipe must comply with section 19-3 except the gradation of structure backfill must comply with the following table:

Gradation of Structure Backfill for Plastic Pipe

Sieve size	Percentage passing
1-1/2"	100
No. 4	25–70
No. 50	5–20
No. 200	0–5

Controlled low-strength material and slurry cement backfill must comply with section 19-3.

64-2.02C Corrugated Polyethylene Pipe

Corrugated polyethylene pipe must be 60 inches or less in nominal diameter.

Type C and Type S corrugated polyethylene pipe must be manufactured from HDPE virgin compounds and comply with AASHTO M 294.

HDPE compounds used in the manufacture of corrugated polyethylene pipe and fittings must comply with AASHTO M 294 except the mix must contain from 2 to 4 percent well-dispersed carbon black.

The corrugated polyethylene pipe manufacturer must:

1. Participate in the National Transportation Product Evaluation Program for each plant supplying corrugated polyethylene pipe and fittings for the project
2. Conduct and maintain a quality control program under National Transportation Product Evaluation Program

64-2.02D Corrugated PVC Pipe with Smooth Interior

Corrugated PVC pipe must have smooth interior and be manufactured as a single extrusion. The corrugated exterior profile must be annular and seamless. The pipe dimensions, wall thickness, socket sizes, and fitting tolerances must comply with ASTM F949.

The minimum stiffness of corrugated PVC pipe must be 46 psi when tested under ASTM D2412.

Corrugated PVC pipe and fittings must be manufactured from PVC virgin compounds, except clean, reworked, recycled PVC materials generated from the manufacturer's pipe or fitting fabrication may be reused.

Corrugated PVC pipe must comply with ASTM F949 for cell classification 12454 under ASTM D1784. Fillers that lower the tensile strength of the compound or change the minimum cell classification are not allowed. PVC compounds must contain at least 0.5 percent by weight rutile titanium dioxide or the quantity recommended by the pipe manufacturer.

The chemical resistance of corrugated PVC pipe and fittings must comply with ASTM D5260 for cell classification S47552.

The manufacturer's code must include the day, month, year, shift, and plant of manufacture.

Do not expose pipes to direct sunlight for more than 30 days.

64-2.02E Joints

Plastic pipe joints must comply with section 61-2.01D(2)(b) for standard or positive joints. Where sleeve joint connections are used, the sleeve width must be at least 7-3/4 inches and engage at least 2 corrugations of each pipe being joined.

Joints for pipes shown as watertight must be watertight under pressure and all conditions of expansion, contraction, and settlement, and must comply with section 61-2.01D(2)(a) for watertightness.

For corrugated polyethylene pipe:

1. If watertight joints are shown, use Type S corrugated polyethylene pipe with gaskets. If watertight joints are not shown, use gasketed joints when specified. Gaskets for Type C corrugated polyethylene pipe must be installed on each side of the joint. Gaskets must comply with ASTM F477 and be factory-installed.
2. Corrugated polyethylene pipe joints manufactured to comply with section 61-2.01D(2)(b) for integral joints must be laid to line and grade with sections closely jointed. Corrugated polyethylene pipe to be joined by sleeve joints must be laid to line and grade with the separate sections not more than 1-1/2 inches apart and then firmly joined together with at least 2 corrugations from each pipe section engaged in the coupler.

For corrugated PVC pipe with smooth interior:

1. Elastomeric gaskets must comply with ASTM F477 for low-head applications. Use extruded or molded gaskets cured in a way so that any cross section will be dense, homogeneous, and free of pores, blisters, pitting or other imperfections. Double gaskets must be single-piece gaskets that fit into the first 2 full corrugation valleys on the spigot end. Ship gaskets in containers that will prevent damage from UV exposure and handling.
2. Wyes, tees, reducers, elbows, couplings, laterals, and other fittings must be molded or fabricated under ASTM F949 for cell classification 12454 or 13343 as specified in ASTM D1784.
3. Lubricant must comply with the pipe manufacturer's instructions. The lubricant must not have a detrimental effect on gaskets or pipes.
4. Joints must comply with section 61-2.01D(2)(b) for integral joints except the joint overlap requirements are as shown. Pipe joints must be bell and spigot type with gaskets ready for field assembly. Install joints so that the elastomeric gasket will be compressed radially between the pipe bell and spigot to form a tight seal when assembled.

64-2.02F–64-2.02H Reserved

64-2.03 CONSTRUCTION

64-2.03A General

Install Type C corrugated polyethylene pipe wherever corrugated interior wall type is shown.

Install Type S corrugated polyethylene pipe or corrugated PVC pipe wherever smooth interior wall type is shown.

You may install corrugated or smooth interior wall pipe if the type of plastic pipe is not shown.

For PVC pipe, whenever the atmospheric temperature is forecast to be 40 degrees F or less, demonstrate to the Engineer that the bar and block method or any other mechanical assistance method for assembling the pipes will not damage the pipes before proceeding with pipe assembly.

64-2.03B Earthwork

Excavation, backfill, and shaped bedding must comply with section 19-3 except:

1. Where saturated clay, peat, or other unsuitable material is encountered immediately adjacent to the pipe trench, remove the material to a distance at least equal to the pipe diameter on each side of the pipe if compacted backfill is to be placed or a distance at least equal to 1/4 the pipe diameter, but not less than 6 inches, on each side of the pipe if slurry cement or controlled low-strength material is to be placed.
2. Backfill corrugated polyethylene pipe greater than 48 inches in nominal diameter with either controlled low-strength material under section 19-3.02G or with slurry cement backfill under section 19-3.02E.
3. Place controlled low-strength material or slurry cement backfill used for structure backfill to a level at least 12 inches above the pipe crown.

Lay plastic pipe in a trench excavated to the established lines and grades. Grade and prepare the bottom of the trench as shown throughout the entire length of the pipe.

Removing unsuitable material and replacing it with suitable material is change order work.

64-2.03C Pipe Placement

Provide the necessary facilities for lowering and properly placing pipe sections in the trench.

Lay plastic pipe to line and grade with sections closely jointed.

Do not let the pipe trench flood before backfilling.

Construct concrete collars or tee connections with minor concrete whenever concrete collars or tee connections are required to connect new plastic pipe to existing or new pipe. Reinforcement for concrete collars and tees must comply with section 52.

For corrugated PVC pipe with smooth interior:

1. Install gaskets on pipe spigots after the pipe is placed into the trench and ready for joint connection. Place the gasket on the spigot end under the pipe manufacturer's installation instructions. The leading edge of the gasket must point toward the spigot end whenever a double gasket is used. Both the spigot and bell ends must be free of debris before connection. Apply the pipe manufacturer's recommended lubricant to the inside of the bell and over the gasket. Insert the spigot end of the pipe into the bell end until the factory provided insertion line on the spigot end lines up with the bell edge.
2. Whenever the spigot end of a pipe is shortened, cut the end square and bevel it to the same angle as provided on the factory-finished spigot end so that burrs are not visible. Re-mark the shortened pipe with a new insertion line on the spigot using a factory-marked spigot insertion line as a guide.
3. Cover the ends of installed corrugated PVC pipe that were not backfilled after installation at the end of each day.
4. Pipes must not exhibit deflection in excess of 5 percent of the original inside diameter at any location after being backfilled to at least 5 feet above the top of the pipe or to the completed grade, whichever is less.

64-2.04 PAYMENT

The payment quantity for plastic pipe:

1. Is the length designated by the Engineer
2. Is measured along the centerline of the pipe and parallel with the slope line
2. Includes the length of pipe elbows, wyes, tees, and other branches to the point of intersection
3. Is the length of pipe necessary to be placed before cutting, measured in 2-foot increments, if the pipe is cut to fit a structure or slope

64-3 SLOTTED PLASTIC PIPE**64-3.01 GENERAL****64-3.01A Summary**

Section 64-3 includes specifications for constructing slotted plastic pipe.

Slotted plastic pipe includes structure excavation, concrete backfill, connecting new pipe to new or existing facilities, concrete collars, reinforcement, and other connecting devices.

64-3.01B Definitions

Reserved

64-3.01C Submittals

If an or equal slotted plastic pipe is being considered, it must be submitted 30 days before installation for approval.

If RSC is used for concrete backfill for slotted plastic pipe, submit the concrete mix design and test data from an authorized laboratory 10 days before excavating the pipe trench. The laboratory must specify the cure time required for the concrete mix to attain 2,000 psi compressive strength when tested under California Test 521.

Heel-resistant grates if specified must be submitted 30 days before installation for approval. Anchorage details must be included in the submittal.

64-3.01D Quality Assurance

Reserved

64-3.02 MATERIALS**64-3.02A General**

Not Used

64-3.02B Slotted Plastic Pipes

Slotted plastic pipe must be one of the following or equal:

Slotted Plastic Pipe

12" diameter	18" diameter
Zurn Z888-12	Zurn Z888-18
ACO Qmax 350	ACO Qmax 365
ADS Duraslot-12	ADS Duraslot-18

64-3.02C Concrete Backfill

Not Used

64-3.02D Heel-Resistant Grates

Heel-resistant grate must:

1. Be designed to carry traffic loadings
2. Comply with ADA requirements
3. Be constructed of steel or cast iron
4. Be provided by the same manufacturer of the slotted plastic pipe
5. Comply with the manufacturer's instructions

64-3.02E Bar Reinforcement

Bar reinforcement must comply with ASTM A615/A615M, Grade 60 or ASTM A706/A706M, Grade 60.

64-3.02F Miscellaneous Metal

Ductile iron, nuts, bolts, and washers must comply with section 75.

64-3.02G Grout

Grout must be non-shrink grout complying with ASTM C1107/C1107M.

64-3.02H Curing Compound

Non-pigmented curing compound must comply with ASTM C309, Type 1, Class B.

64-3.02I End Caps

End cap must:

1. Be provided by the same manufacturer of the slotted plastic pipe
2. Prevent concrete backfill from entering the pipe

64-3.03 CONSTRUCTION**64-3.03A General**

Cover the grate slots with heavy-duty tape or other authorized covering during paving and concrete backfilling activities to prevent material from entering the slots.

64-3.03B Preparation

Pave adjacent traffic lanes before installing slotted plastic pipes.

Excavation must comply with section 19-3.

64-3.03C Installation

Lay and join slotted plastic pipes under the pipe manufacturer's instructions.

Lay pipes to line and grade with sections closely jointed and adequately secured to prevent separation during placement of the concrete backfill. If the pipes do not have a positive interlocking mechanism like a slot and tongue connection, secure the sections together with nuts, bolts, and washers before backfilling.

The top of slotted plastic pipes must not extend above the completed surface. Position the pipes so that the concrete backfill is flush with the surrounding grade and above the top of the grate from 1/8 to 1/4 inch.

Place channels with the male and female ends facing each other.

Place lateral support bar reinforcement on both sides of the grate slots. The support bar reinforcement must run the full length of the slots.

Anchor heel-resistant grates to the concrete backfill under the manufacturer's instructions.

64-3.03D Concrete Backfill

Not Used

64-3.03E Transition Fittings

Use transition fittings to connect slotted plastic pipes to drainage inlets. The transition fittings must be supplied by the same pipe manufacturer.

Where welds are required in transition fittings, welds must comply with the pipe manufacturer's instructions. The completed welds must not have visible pinholes. Fill the gaps around the pipes in the inlet structure wall with non-shrink grout where the pipes connect to an existing drainage structure. Install the grout under the pipe manufacturer's instructions.

Cut the pipes as shown after the grout used to seal the transition fitting has cured for at least 24 hours.

64-3.04 PAYMENT

Slotted plastic pipe is measured along the centerline of the pipe and parallel with the slope line. If the pipe is cut to fit a structure or slope, the payment quantity is the length of pipe necessary to be placed before cutting, measured in 2-foot increments.

64-4-64-10 RESERVED

Replace section 68 with:

68 SUBSURFACE DRAINS

68-1 GENERAL

68-1.01 GENERAL

68-1.01A Summary

Section 68-1 includes general specifications for constructing subsurface drains.

68-1.01B Definitions

Reserved

68-1.01C Submittals

Submit a certificate of compliance for each type of subsurface drain involved.

68-1.01D Quality Assurance

Reserved

68-1.02 MATERIALS

68-1.02A General

Reserved

68-1.02B Protective Coating

If described as coated, subsurface drains must be protected with a coating under section 66-1.02C.

68-1.03 CONSTRUCTION

68-1.03A General

Repair damaged coatings under section 66-1.02C.

68-1.03B Filter Fabric

Remove loose or extraneous material and sharp objects immediately before placing filter fabric.

The subgrade and trench to receive the filter fabric must comply with the compaction and elevation tolerance specified for the material involved.

Handle and place filter fabric under the manufacturer's instructions.

Align and place filter fabric without wrinkles.

Overlap adjacent roll ends of filter fabric at least 18 inches. The preceding roll must overlap the following roll in the direction that the permeable material is being spread.

Completely replace torn or punctured sections damaged during placement or repair by placing a piece of filter fabric that is large enough to cover the damaged area and comply with the overlap specified.

Cover filter fabric with the thickness of overlying material within 72 hours of placing the fabric.

68-1.04 PAYMENT

Not Used

68-2 UNDERDRAINS

68-2.01 GENERAL

68-2.01A Summary

Section 68-2 includes specifications for constructing underdrains.

Excavation and backfill must comply with section 19-3.

68-2.01B Definitions

Reserved

SECTION 68

SUBSURFACE DRAINS

68-2.01C Submittals

Submit a certificate of compliance for each type of pipe, tubing, and fitting.

68-2.01D Quality Assurance

Reserved

68-2.02 MATERIALS

68-2.02A General

Not Used

68-2.02B Perforated Steel Pipe

Not Used

68-2.02C Perforated Aluminum Pipe

Not Used

68-2.02D Perforated Plastic Pipe

Perforated plastic pipe must be smooth-wall PVC plastic pipe, corrugated PVC plastic pipe with a smooth interior surface, or corrugated polyethylene plastic tubing.

Smooth-wall PVC plastic pipe must comply with AASHTO M 278.

Corrugated PVC plastic pipe with a smooth interior surface must comply with material and structural requirements in AASHTO M 278. Pipe must have perforations located in the bottom half of the pipe; the perforations must be slots complying with the size and opening area requirements in AASHTO M 252. Inside diameter and diameter tolerances must comply with AASHTO M 252 or M 278.

Corrugated polyethylene plastic tubing must comply with AASHTO M 252 or M 294.

PVC plastic pipe must be connected with belled ends, or with sleeve-type or stop-type couplings under AASHTO M 278. Polyethylene tubing must be connected with snap-on, screw-on, or wrap-around fittings and couplings under AASHTO M 252 or AASHTO M 294.

68-2.02E Underdrain Outlets and Risers

Not Used

68-2.02F Permeable Material

68-2.02F(1) General

Permeable material for use in backfilling trenches under, around, and over underdrains must consist of hard, durable, clean sand, gravel, or crushed stone and must be free from organic material, clay balls, or other deleterious substances.

Permeable material must have a durability index of not less than 40.

~~Use Class 1 permeable material for underdrains unless the class or type of permeable material is shown specified in the special provisions.~~

~~At bridge abutments and wingwalls, use either Class 1 or Class 2 permeable material. Place filter fabric between Class 1 permeable material and backfill.~~ No filter fabric is required with Class 2 permeable material.

68-2.02F(2) Class 1 Permeable Material

Not Used

68-2.02F(3) Class 2 Permeable Material

The percentage composition by weight of Class 2 permeable material in place must comply with the gradation requirements shown in the following table:

**Class 2 Permeable Material
Gradation Requirements**

Sieve size	Percentage passing
1"	100
3/4"	90–100
3/8"	40–100
No. 4	25–40
No. 8	18–33
No. 30	5–15
No. 50	0–7
No. 200	0–3

Class 2 permeable material must have a sand equivalent value of not less than 75.

68-2.02F(4) Class 3 Permeable Material

Not Used

68-2.02F(5) Bioretention Soil Mix

BSM must conform to the provisions of the Municipal Regional Stormwater Permit (MRP), specifically Provision C.3.c.i(1)(b)(vi) that was approved by the Regional Water Board Executive Officer on April 18, 2016 (also known as [MRP Attachment L](#)).

For your convenience (not an endorsement), the Alameda Countywide Cleanwater Program provides a list of BSM suppliers on its [website](#).

The soil supplier must choose a qualified testing laboratory for the analysis of compost quality per BASMAA BSM specifications.

68-2.02G Filter Fabric

Filter fabric for use with underdrains must comply with section 96-1.02B.

At bridge abutments and wingwalls, filter fabric for underdrains must be Class A.

68-2.02H–68-2.02N Reserved

68-2.03 CONSTRUCTION

Excavate trenches for underdrains, place filter fabric, install pipe, and backfill trenches with permeable material as shown. Where underdrains are installed in trenches outside the subgrade area, backfill the top 6 inches of the trench with structure backfill complying with section 19-3.

Join lengths of perforated steel pipe and perforated aluminum pipe with couplers.

Lay perforated pipe with the perforations down.

Solvent cementing of joints on perforated plastic pipe is not required.

Repair damaged galvanized surfaces under section 75-1.02B.

Underdrain outlets and riser covers must seat uniformly and not be subject to rocking.

Place perforated polyethylene tubing to line and grade in a close-fitting semicircular bedding groove formed in the bottom of the trench.

~~At bridge abutments and wingwalls:~~

- ~~1. Install welded steel covers on underdrains terminating underground.~~
- ~~2. Place permeable material in horizontal layers. Thoroughly consolidate permeable material along with and by the same methods specified for structure backfill in section 19-3. Ponding~~

~~and jutting of permeable material or structure backfill adjacent to permeable material is not allowed.~~

- ~~3. You may substitute permeable material for structure backfill material where the required width of backfill material adjacent to the neat lines of the permeable material as shown is approximately 1 foot or less.~~

68-2.04 PAYMENT

The payment quantity for pipe underdrain is the length measured parallel with the slope line. The payment quantity includes the length measured along the centerline of elbows, outlets and risers and the length of wyes, tees, and other branches to the point of intersection.

The payment quantity for Class 2 Permeable Base and Bioretention Soil Mix is the volume of material measured in place.

68-3 HORIZONTAL DRAINS

Not Used

68-4 EDGE DRAINS

Not Used

68-5 PERMEABLE MATERIAL BLANKET

Not Used

68-6 RESERVED

Not Used

68-7 GEOCOMPOSITE DRAIN SYSTEMS

Not Used

68-8–68-15 RESERVED

Replace section 71 with:

71 EXISTING DRAINAGE FACILITIES

71-1 GENERAL

71-1.01 GENERAL

Section 71-1 includes general specifications for performing work on existing drainage facilities, including sanitary systems.

Drainage facilities include culverts, inlets, headwalls, endwalls, aprons, drains, pipes, gutters, gutter depressions, junction structures, spillways, and check dams.

71-1.02 MATERIALS

Temporary pipe plug must be one of the following:

1. Wall of minor concrete not less than 6 inches thick
2. Tight brick wall not less than 8 inches thick with cement mortar joints
3. Commercially-manufactured plug if its use is required for less than 6 months

71-1.03 CONSTRUCTION

Trenches, holes, depressions, and pits caused by removing, salvaging, reconstructing, abandoning, destroying, modifying, resetting, relocating, adjusting, relaying, remodeling, and rehabilitating highway facilities must be backfilled with embankment material under section 19. If the trenches, holes, depressions, and pits are in surfaced areas that remain undisturbed, backfill with material that is equal or better in quality and to the thickness of the surrounding materials.

Where partial removal of reinforced concrete is required, remove a sufficient volume of concrete to expose the reinforcement for splicing. Splicing must comply with section 52. Clean off material adhering to the reinforcement before placing new concrete.

71-1.04 PAYMENT

Not Used

71-2 REMOVE DRAINAGE FACILITIES

Not Used

71-3 REHABILITATE DRAINAGE STRUCTURES

Not Used

71-4 MODIFY DRAINAGE STRUCTURES

71-4.01 GENERAL

71-4.01A General

Section 71-4 includes specifications for partially removing, adjusting, and adding to drainage facilities.

71-4.01B Materials

Not Used

71-4.01C Construction

Not Used

71-4.01D Payment

Not Used

71-4.02 PIPES

71-4.02A General

Modifying drainage structures ~~pipes~~ includes extending pipes. Extending pipes must comply with the specifications for new pipe installation.

SECTION 71

EXISTING DRAINAGE FACILITIES

71-4.02B Materials

Not Used

71-4.02C Construction

Existing headwalls or end walls must be removed or moved to a new location.

If headwalls or end walls are to be moved, cut the pipe so that it has smooth edges at a point approximately 1 foot behind the headwall or end walls and perpendicular to the centerline of the pipe. Move the headwall or end wall to the reconstructed location and connect the pipes.

71-4.02D Payment

Not Used

71-4.03 INLETS, MANHOLES, AND RISERS

71-4.03A General

Not Used

71-4.03B Materials

Not Used

71-4.03C Construction

Modify inlet, manhole, and riser structures as shown or described by capping.

~~Excavate and remove structures to a depth of at least 1 foot below the grading plane.~~

Modify Cap inlet structures with minor concrete. Where shown, round the bottom of structures with minor concrete. Minor concrete must contain at least 590 pounds of cementitious material per cubic yard.

Backfill to match the grading plane

71-4.03D Payment

Not Used

71-4.04 SLOTTED PIPE GRATE

Reserved

71-5 ADJUST DRAINAGE STRUCTURES

71-5.01 GENERAL

Section 71-5 includes specifications for partially removing and either lowering or raising facilities.

Adjust to grade with new materials that are similar in character to the existing materials.

71-5.02 MATERIALS

Not Used

71-5.03 CONSTRUCTION

71-5.03A General

Not Used

71-5.03B Frames, Covers, Grates, and Manholes

Adjust frames, covers, grates and manholes by lowering before cold planing and raising after paving or surfacing. Before opening the lane to traffic, either (1) complete permanent paving or surfacing or (2) temporarily fill any depressions with HMA.

Where paving or surfacing work is shown, do not adjust to final grade until the adjacent pavement or surfacing is complete.

For a structure that is to be raised, remove the cover or frame and trim the top of the structure to provide a suitable foundation for the new material.

SECTION 71

EXISTING DRAINAGE FACILITIES

Instead of using new materials similar in character to those in the existing structure, you may use raising devices to adjust a manhole to grade. Before starting paving work, measure and fabricate raising devices. Raising devices must:

1. Comply with the specifications for section 75 except that galvanizing is not required
2. Have a shape and size that matches the existing frame
3. Be match marked by painting identification numbers on the device and corresponding structure
4. Result in an installation that is equal to or better than the existing one in stability, support, and nonrocking characteristics
5. Be fastened securely to the existing frame without projections above the surface of the road or into the clear opening

Where manholes are to be lowered, remove the facility to 3.5 feet below finished grade or to an authorized depth. Adjust the manhole using the taper needed to match the finished grade.

If a manhole cover is unstable or noisy under traffic, place a coil of asphalt-saturated rope, a plastic washer, or asphaltic compound on the cover seat. Before placement, obtain authorization for use of the material.

71-5.03C Inlet

Adjust inlets as shown.

Use minor concrete with at least 590 pounds of cementitious material per cubic yard.

Where inlets are adjusted before placing the uppermost layer of pavement or surfacing, limit the work area so that adjusting the inlet and final paving or surfacing is completed within the same work day. The top of the inlet grate or cover must be protected during paving operations by heavy plywood covers, steel plate covers, or other authorized methods. Excess paving material must be removed before rolling.

Where inlets are adjusted after placing the uppermost layer of pavement or surfacing, do not adjust the inlet to final grade until the paving or surfacing has been completed immediately adjacent to the inlet.

71-5.04 PAYMENT

If adjust inlet is paid by the linear foot, adjusting the inlet is measured as the difference in the length between the top of the existing inlet and the top of the adjusted inlet.

If no item is shown for adjust inlet, payment for adjusting the inlet is included in the payment for the type of pavement or surfacing shown in the Bid Item List.

If (1) no item is shown for adjust inlet and (2) pavement or surfacing is not involved, payment for adjusting the inlet is included in the payment for the type of excavation shown in the Bid Item List.

If no item is described for adjust (1) frames, (2) covers, (3) grates, or (4) manholes, payment for adjusting these materials is included in the payment for the type of pavement or type of surfacing in the Bid Item List.

If no item is shown for adjust (1) frames, (2) covers, (3) grates, or (4) manholes, and if pavement or surfacing is not involved, payment for adjusting these materials is included in the payment for the type of excavation shown in the Bid Item List.

71-6 ABANDON DRAINAGE STRUCTURES

Not Used

71-7 SALVAGE DRAINAGE FACILITIES

Not Used

71-8–71-15 RESERVED

DIVISION VIII MISCELLANEOUS CONSTRUCTION

Replace section 73 with:

73 CONCRETE CURBS AND SIDEWALKS

73-1 GENERAL

73-1.01 GENERAL

Section 73-1 includes general specifications for constructing concrete curbs, sidewalks, and their appurtenances, such as gutter depressions and island paving; and curb ramps and driveways.

Steel dowels, reinforcing steel, and welded wire reinforcement must comply with section 52.

73-1.02 MATERIALS

73-1.02A General

Concrete for curbs, sidewalks and their appurtenances must be minor concrete containing at least 463 pounds of cementitious material per cubic yard.

Extruded or slip form construction is not allowed unless shown. For extruded or slip form curb construction, the maximum aggregate size must be from 3/8 to 1 inch. The cementitious material content must be at least 505 pounds per cubic yard if a maximum of 3/8-inch aggregate is used.

Preformed expansion joint filler must comply with ASTM D1751.

Mortar must comply with section 51-1.02F.

Form oil must:

1. Be commercial quality or an equivalent coating
2. Allow the ready release of forms
3. Not discolor the concrete

73-1.02B Detectable Warning Surfaces

A detectable warning surface must be on the Authorized Material List for detectable warning surfaces and must match yellow color no. 33538 of FED-STD-595.

The finished surfaces of the detectable warning surface must be free from blemishes.

73-1.02C Lamp Black

When directed by the Engineer, thoroughly mix into the concrete ½ pound of lamp black per cubic yard of concrete so as to produce a uniform gray color.

73-1.03 CONSTRUCTION

73-1.03A General

Construct contraction joints by (1) scoring concrete with a grooving tool and rounding corners with an edger tool or (2) saw cutting hardened concrete to a depth of at least 1 inch. Immediately apply curing compound to the exposed surfaces of saw cut joints.

Construct expansion joints at each side of structures and at the ends of curb returns. Fill expansion joints with 1/4-inch-thick preformed joint filler. Finish the concrete adjacent to expansion joints with an edger tool. Do not construct expansion joints within 20 feet of an island nose. Shape the preformed joint filler to match the surface contour of the concrete.

73-1.03B Subgrade Preparation

~~Remove soft or spongy basement material to a depth of 6 inches below the subgrade elevation for curbs, gutter depressions, island paving, and driveways and 3 inches below the subgrade elevation for sidewalks and curb ramps. Backfill the subgrade with earth, sand, or gravel to produce a stable foundation.~~

Apply water to the subgrade and thoroughly compact it before placing aggregate base cushion material that complies with section 26-1.02D concrete.

Prepare subgrade to required grade and cross section to receive at least 4 inches of aggregate base cushion material. Place base and compact to 90 percent relative compaction before placing concrete. Verify that the finished surface of the base subgrade does not project into the concrete cross section at any point by:

1. Using a template supported on the side forms for the fixed form method
2. Measuring from the offset guide line or survey marks for the extruded or slip form method

73-1.03C Fixed Form Method

Set forms to the required alignment, grade, and dimensions.

Forms must:

1. Be smooth on the side placed against concrete.
2. Have a straight upper edge.
3. Be rigid enough to withstand the pressure of fresh concrete without distortion. Use enough stakes, clamps, spreaders, and braces to ensure rigidity.
4. Be clean of debris and old concrete.
5. Coated with form oil before placing concrete.

You may use either benders or thin plank forms on curves, grade changes, or curb returns.

Wet the subgrade and forms immediately before placing the concrete.

Place the preformed joint filler at expansion joints in the correct position before placing concrete against the filler.

Place and compact the concrete without segregation.

73-1.03D Extruded and Slip Form Methods

Wet the subgrade immediately before placing the concrete.

Feed concrete into the extrusion machine at a uniform rate. Restrain forward travel of the extrusion machine to produce a well-compacted mass of concrete requiring no further finishing other than a light brushing. The brush may be filled with water. Do not finish the concrete surface with a brush application of grout.

If you use a slip form machine, automatically control the alignment, grade, and cross slope by one of the following methods:

1. Sensing from preset string lines
2. String line control of the alignment and grade and automatic control of the cross slope

The slip form machine must have traveling forms rigid enough to produce the required cross section. The machine must produce a dense, homogeneous concrete, true to grade and cross section and require minimum handwork. Consolidate the concrete with internal vibrators or other authorized method.

Use a smaller, maximum size of aggregate with an extruded or slip form machine if it is required to produce concrete (1) free from surface pits larger than 3/16 inch in diameter and (2) with well-defined web marks of water on the surface.

You may construct expansion joints by sawing through the concrete cross section to its full depth. The width of the cut must provide a tight fit for the joint filler. Insert preformed joint filler into sawed joints and mortar it in place.

If a joint is cut before the concrete has hardened:

1. Protect the adjacent surfaces with close fitting, firmly supported shields
2. Complete the saw cut and insertion of the preformed joint filler before curing the concrete

If a joint is cut after the concrete has hardened:

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CONCRETE CURBS AND SIDEWALK

1. Mortar preformed joint filler in place using heavy trowel pressure
2. Cover the exposed portions of the concrete in the vicinity of the saw cut with an additional application of curing compound

After the concrete has cured, check the joint filler for a tight fit. If any loose joints are found, mortar the joint in place and recheck after the mortar has cured. Repeat as necessary to achieve a tight fit.

73-1.03E Curing

Cure concrete using the curing compound method with pigmented curing compound.

Completely coat the exposed faces of the concrete with curing compound.

73-1.04 PAYMENT

Not Used

73-2 CURBS

73-2.01 GENERAL

Section 73-2 includes specifications for constructing curbs.

73-2.02 MATERIALS

Not Used

73-2.03 CONSTRUCTION

73-2.03A General

If curbs are constructed over existing pavement, use steel dowels and reinforcing steel or adhesive to anchor the curb to the existing pavement.

Anchor steel dowels in drilled holes with mortar made from equal parts by volume of portland cement, sand, and water. You may use anchor bolts instead of anchored steel dowels if authorized.

If adhesive is used, remove all dust, loose material, or oil from the surface of the existing pavement by either wire brushing or blast cleaning.

Construct contraction and expansion joints at right angles to the line of the curb. Space contraction joints at 20-foot intervals. For curbs adjacent to existing concrete, align the curb joints with the existing concrete's pavement joints.

The top and face of the finished curb must be true and straight. The top surface of the curb must be uniform in width and free from humps, sags, or other irregularities. Clean any discolored concrete by abrasive blast cleaning or other authorized method.

Except for curbs on structures, you may place curbs with an extrusion machine or a slip form paver if:

1. Shown

24. Finished curb is true to line and grade

32. Concrete contains the maximum quantity of water that maintains the curb's shape without support

43. Required surface texture is attained

Check the flatness of the top and face of the curb and the surface of the gutter with a 10-foot straightedge. The surfaces must be flat to within 0.01 foot except at grade changes or curves.

73-2.03B Fixed Form Method

Set fixed forms the full depth of the back and face of the curb.

The back forms may be constructed with 1/2-inch-thick bender boards.

Cleat the back forms together as required to attain the full depth of the curb.

Use form clamps to prevent interference with finishing activities.

SECTION 73

CONCRETE CURBS AND SIDEWALK

Before removing the forms, finish the surface true to grade with a straightedge float at least 10 feet in length. Operate the straightedge float longitudinally over the concrete surface.

Remove the forms from the face of the curb from 1 to 6 hours after placing the concrete. Do not remove the forms if the concrete is plastic enough to slump.

After removing the forms, immediately use a steel trowel to attain a smooth finish. The smooth finish must extend (1) to within 0.17 foot of the flow line or (2) to the flow line of a curb with an integral gutter. After smoothing the curb's face, apply a fine-brush finish parallel to the line of the curb.

73-2.03C Extruded or Slip Form Methods

For an extrusion machine, use the Agency's survey marks to determine the offset guide line for setting the grade for the top of the curb. The extrusion machine must have a grade-line gauge or pointer that allows continual comparison between the curb placement and the offset guide line.

The machine must be capable of vertical adjustment during forward travel to construct curbs of varying height as determined by the offset guide line.

You may operate the extrusion machine on rails or forms set at a uniform depth below the established grade of the top of curb.

73-2.04 PAYMENT

The quantity of curb and gutter and island curb to be paid for will be determined by measuring the length along the face of curb to the nearest 0.1 foot.

73-3 SIDEWALKS, GUTTER DEPRESSIONS, ISLAND PAVING, CURB RAMPS, AND DRIVEWAYS

73-3.01 GENERAL

73-3.01A Summary

Section 73-3 includes specifications for constructing sidewalks, gutter depressions, island paving, curb ramps, and driveways.

73-3.01B Definitions

Reserved

73-3.01C Submittals

Submit a 5-year manufacturer's replacement warranty against defects in a prefabricated detectable warning surface.

73-3.01D Quality Assurance

73-3.01D(1) General

Reserved

73-3.01D(2) Warranties

The 5-year manufacturer's replacement warranty for a prefabricated detectable warning surface must cover defects in dome shape, color fastness, sound-on-cane acoustic quality, resilience, and attachment. The 5-year warranty period starts at Contract acceptance. Provide an extended guarantee under section 5-1.48.

73-3.01D(3) Quality Control

Reserved

73-3.02 MATERIALS

Cushion material must confirm to section 26-1.02D.

73-3.03 CONSTRUCTION

Install block-outs as necessary to accommodate the installation of posts and poles.

Construct expansion joints at:

SECTION 73

CONCRETE CURBS AND SIDEWALK

1. All returns and opposite expansion joints in the adjacent curb or offset curb
2. 60-foot intervals and at each side of a driveway where there is no adjacent curb

Construct contraction joints to create rectangular patterns from 12 to 20 square feet in the surface of sidewalks. The length to width ratio of the rectangle must not exceed 1.33. Use a scoring tool that will leave the edges rounded.

Install a prefabricated detectable warning surface under the manufacturer's instructions.

Broom finish the surface of sidewalks, gutter depressions, curb ramps, and driveways. Make the broom finish perpendicular to the path of travel on surfaces used by pedestrians. You may apply water to the surface immediately before brooming.

The finished surface must not vary more than 0.02 foot from a 10-foot straightedge except at grade changes.

If placing pavement around or adjacent to manholes, pipe inlets, or other miscellaneous structures in sidewalk, gutter depression, island paving, curb ramps, or driveway areas, do not finish the miscellaneous structures to final grade until the pavement is finished beyond the miscellaneous structure.

If using fixed forms, strike off and compact fresh concrete until a layer of mortar is brought to the surface. Finish the surface with a float to grade and cross section and trowel smooth.

Leave forms in place for sidewalks, gutter depressions, island paving, curb ramps, and driveways for at least 12 hours after surface finishing.

Clean any discolored concrete by abrasive blast cleaning or other authorized method.

73-3.04 PAYMENT

The quantity of sidewalk to be paid for will be determined by measuring the length of the center line and the width at right angles to the center line to compute the area in square feet to the nearest 0.1 of a square foot.

Payment includes the cost of providing concrete block-outs and no reduction of sidewalk area is made because of concrete block-outs.

The quantity of cushion material is not measured.

The payment quantity for minor concrete (curb ramp) does **not** include detectable warning surface unless the Bid Item List includes a separate bid item for detectable warning surface.

73-4 TEXTURED CONCRETE AND COLORED CONCRETE SURFACES

Not Used

73-5-73-9 RESERVED

73-10 EXISTING CURBS AND SIDEWALKS

73-10.01 GENERAL

Section 73-10 includes specifications for performing work on existing curbs, sidewalks, and their appurtenances, such as gutter depressions and island paving.

Work performed on existing curbs and sidewalks must comply with section 15.

73-10.02 MATERIALS

Not Used

73-10.03 CONSTRUCTION

If you repair any part of a curb, sidewalk, curb ramp, driveway, or gutter depression, remove and replace the entire section between contraction or expansion joints. At contraction joints, saw cut a true line at least 1-1/2 inches deep before concrete removal. Removal of concrete includes the removal of detectable warning surfaces.

SECTION 73**CONCRETE CURBS AND SIDEWALK**

Install a prefabricated detectable warning surface on an existing curb ramp under the manufacturer's instructions.

73-10.04 PAYMENT

Detectable warning surface placed on existing concrete is paid for as a separate bid item.

73-11-73-15 RESERVED

Replace section 75 with:

75 MISCELLANEOUS METAL

75-1 GENERAL

75-1.01 GENERAL

75-1.01A Summary

Section 75 includes specifications for fabricating and installing miscellaneous metals.

Welding must comply with AWS D1.1.

75-1.01B Definitions

Reserved

75-1.01C Submittals

Reserved

75-1.01D Quality Assurance

75-1.01D(1) General

Reserved

75-1.01D(2) Qualifications

Welders and welding operators must be qualified under AWS D1.1.

75-1.01D(3) Agency Acceptance

The following miscellaneous metal materials are inspected at the fabrication site:

1. Miscellaneous iron and steel
2. Miscellaneous metal (bridge)

Notify the Engineer:

1. When materials listed above have been delivered to the fabrication site
2. At least 10 days before starting fabrication

75-1.02 MATERIALS

75-1.02A General

Materials must comply with the requirements shown in the following table:

Miscellaneous Metal Materials

Material	Requirement
Steel bars, plates, and shapes	ASTM A36/A36M, A575, or A576 (AISI or M Grades 1016–1030)
Steel fastener components for general applications:	
Bolts and studs	ASTM A307
Anchor bolts	ASTM F1554 ^a
HS bolts and studs	ASTM A449, Type 1 ^a
HS threaded rods	ASTM A449, Type 1 ^a
HS nonheaded anchor bolts	ASTM F1554, Grade 105, Class 2A ^a
Nuts	ASTM A563, including appendix X1 ^b
Washers	ASTM F844
Hardened washers	ASTM F436, Type 1, including S1 supplementary requirements
Components of HS steel fastener assemblies for use in HS joints:	
Bolts	ASTM F3125, Grade A325, Type 1
Tension control bolts	ASTM F3125, Grade F1852, Type 1
Nuts	ASTM A563, including appendix X1 ^b
Hardened washers	ASTM F436, Type 1, Circular, including S1 supplementary requirements
Direct tension indicators	ASTM F959, Type 325, zinc-coated
Stainless steel fasteners, alloys 304 & 316, for general applications:	
Bolts, screws, studs, threaded rods, and nonheaded anchor bolts	ASTM F593
Nuts	ASTM F594 or F836M
Washers	ASTM A240/A240M and ASME B18.22M
Gray iron castings:	
Inside a roadbed	AASHTO M 306
Outside a roadbed	AASHTO M 306 except only AASHTO M 105, Class 35B is allowed
Ductile iron castings	ASTM A536, Grade 80-55-06
Carbon-steel castings	ASTM A27/A27M, Grade 65-35, Class 1
Malleable iron castings	ASTM A47/A47M, Grade 32510
Cast iron pipe	Commercial quality
Steel pipe	Commercial quality, welded or extruded
Other parts for general applications	Commercial quality

^aUse hardened washers.

^bZinc-coated nuts tightened beyond snug or wrench tight must be furnished with a dry lubricant complying with supplementary requirement S2 in ASTM A563.

Remove burrs, rough and sharp edges, and other flaws.

Straighten warped pieces after fabricating and galvanizing.

75-1.02B Galvanizing

Galvanize miscellaneous metal materials under the schedules and specifications shown in the following table:

Galvanizing Schedules and Specifications

Material	Schedule ^a	Specification
Rolled, pressed, and forged steel shapes, plates, bars, and strip $\geq 1/8$ inch thick	Except for pregalvanized standard pipe, galvanize material after fabrication into the largest practical sections	ASTM A123/A123M
Steel $<1/8$ inch thick	Galvanize before or after fabrication	Galvanized before fabrication: ASTM A653/A653M, Coating Designation G210 Galvanized after fabrication: ASTM A123/A123M except the weight of zinc coating must average at least 1.2 oz/sq ft of surface area with no individual specimen having a coating weight of less than 1.0 oz/sq ft
Standard pipe	--	ASTM A53/A53M except the zinc coating for fence pipes and structural shapes except for metal line posts for barbed and woven wire fences must average at least 1.2 oz/sq ft of surface area with no individual specimen having a coating weight of less than 1.0 oz/sq ft
Iron and steel hardware except threaded studs, bolts, nuts, and washers specified to comply with ASTM A307; F3125, Grade A325; A449; A563; F436; or F1554 ^b	Galvanize after fabrication	ASTM A153/A153M
Rail elements, backup plates, terminal sections, and end and return caps of guardrail	--	AASHTO M 180

^aFabrication includes shearing, cutting, punching, forming, drilling, milling, bending, welding, and riveting.

^bFor threaded studs, bolts, nuts, and washers specified to comply with ASTM A307; F3125, Grade A325; A449; A563; F436; or F1554, galvanize under their ASTMs.

Galvanizing is not required for stainless steel, monel metal, and similar corrosion-resistant parts.

Galvanizing is not required for the following miscellaneous bridge metal:

1. Portions of plates, shapes, or other items embedded more than 2 inches in concrete.
2. Embedded steel pipe ending at or below the surface of encasing concrete.
3. Items described to receive other finishes.

Clean welded areas before galvanizing to remove slag or other material that would interfere with the adherence of the zinc.

Galvanize parts of fastener assemblies separately before assembly.

Tapping of nuts or other internally threaded parts to be used with zinc-coated bolts, anchor bars, or studs must (1) be performed after galvanizing and (2) comply with thread dimensions and overlapping allowances in ASTM A563.

Repair damaged galvanized surfaces as follows:

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SECTION 75

MISCELLANEOUS METAL

1. Clean by thoroughly wire brushing damaged areas and removing loose and cracked coating.
2. Paint cleaned areas with 2 applications of organic zinc-rich primer from the Authorized Material List for organic zinc-rich primers. Do not use aerosol cans.

75-1.02C–75-1.02H Reserved

75-1.03 CONSTRUCTION

Not Used

75-1.04 PAYMENT

Except for final-pay-item miscellaneous metal materials, the payment quantity for miscellaneous metal material is the weight determined from scale weighings.

75-2 MISCELLANEOUS IRON AND STEEL

75-2.01 GENERAL

Section 75-2 includes specifications for fabricating miscellaneous iron and steel.

75-2.02 MATERIALS

75-2.02A General

Raised pattern plates must be commercial quality.

75-2.02B Frames, Grates, and Covers

Grates must be produced from one of the following:

1. Structural steel complying with either of the following
 - 1.1. ASTM A36/A36M
 - 1.2. ASTM A576, Grades 1021, 1022, 1026, 1029, or 1030
2. Ductile iron castings
3. Carbon-steel castings

Manhole frames and covers must comply with AASHTO M 306.

Galvanize cast iron manhole frames and covers for sidewalks after fabrication and before assembling component parts. Coat other cast iron items with commercial-quality asphalt except machined surfaces of manhole frames and covers for decks.

Drainage inlet frames and grates except those on bridges need not be galvanized or coated with asphalt.

Match-mark frames and grates and frames and covers in pairs before delivery to the job site. Grates and covers must fit into their frames without rocking.

75-2.03 CONSTRUCTION

Not Used

75-2.04 PAYMENT

A frame and cover pair is 1 measurement unit. A frame and grate pair is 1 measurement unit.

75-3 MISCELLANEOUS BRIDGE METAL

Not Used

75-4 PUMPING PLANT METAL WORK

Not Used

75-5 CATTLE GUARD

Not Used

75-6 RIGID FALL PROTECTION

Not Used

SECTION 75

MISCELLANEOUS METAL

75-7 ISOLATION CASINGS

Not Used

75-8 TIE ROD ASSEMBLIES

Not Used

75-9-75-12 RESERVED

Replace section 77 with:

77 LOCAL INFRASTRUCTURE

77-1 GENERAL

77-1.01 GENERAL

Section 77 includes specifications for adjusting, relocating, resetting, furnishing, installing, and maintaining access to and function of local infrastructure, such as utilities and bus stop shelters.

77-1.02 MATERIALS

Not Used

77-1.03 CONSTRUCTION

Not Used

77-1.04 PAYMENT

Not Used

77-2 ALTERATION OF EXISTING UTILITY STRUCTURES

77-2.01 GENERAL

Except for sanitary sewer manholes and survey monuments, make all arrangements for raising utility company owned structures to the new grade.

In addition to these provisions under section 77-2, comply with section 71, Existing Drainage Facilities," where utility structures are similar in form to drainage facilities, i.e, manholes, frames, covers, etcetera.

Any provided number of utility structures that are expected to be impacted is approximate. Visit the site and determine the exact type, amount, and location of the utility structures involved.

77-2.02 MATERIALS

At least 10-days in advance of intended use, submit a written request for adjustment rings to the company that owns the structures to be adjusted. Obtain the adjustment rings from the utility owning the involved facility.

77-2.03 CONSTRUCTION

Install adjustment rings. Mark or reference structures for which adjustment rings cannot be obtained at the time of paving. Cover these structures with building paper and pave them over. Adjustment of these will then be the responsibility of the utility owners.

77-2.04 PAYMENT

The quantity of utility structures will be the number of adjusted structures in place, except sanitary sewer manholes and survey monuments. The quantity is counted once only. Lowering of the structure to facilitate construction operations and then raising the structure to final grade is considered one adjustment.

The quantities of this item set forth on the bid sheet are nominal only. These quantities may be greatly increased or decreased depending upon the actual field condition or as directed by the Engineer. The increase or reduction of these quantities as compared with those set forth on the bid sheet shall not constitute a basis for claim by the Contractor for extra payment or damages. Payment for the actual work performed based upon the prices bid for the items of work involved will be considered full compensation to the Contractor for the work.

77-3 RELOCATION OF GAS AND WATER SERVICES

77-3.01 GENERAL

Do not disturb gas and water service pipes that do not physically conflict with the Contract work. Work around these improvements.

77-3.01A Facilities between the main and the meter

Notify the appropriate utility company if an existing gas or water service pipe between the main and the meter is in physical conflict with or endangered by the proposed work. Conflicting or endangered pipes will be relocated or adjusted by the utility company at no expense to you.

77-3.01B Facilities between the meter and the improvement served

Adjust, reset, or relocate existing water pipes between the meter and the improvement served if they physically conflict with the improvements proposed under the Contract.

Relocate fire department stand pipes as shown on the plans and as directed by the Engineer. Comply with the requirements of the local fire department and local water department. Prepare plans and pay fees for a permit from the local fire department and the local Building Inspection Department prior to relocating the stand pipes.

Relocate water back flow valves as shown on the plans and as directed by the Engineer. Comply with local water department requirements. Prepare plans and pay for fees for a permit from the local Building Inspection Department prior to relocating the back flow valves.

77-3.02 MATERIALS

When resetting water service between the meter and the improvement served, use new materials of the same size, kind and quality as those in the original system unless otherwise approved by the Engineer.

77-3.03 CONSTRUCTION

Not Used

77-3.04 PAYMENT

Only water service pipes between the meter and the improvement served which is to be reset because of physical conflict with proposed improvements, and are not the responsibility of the water district involved, will be measured and paid for. The quantities of pipe to be paid for will be determined by measuring the pipe, regardless of size and material, complete in place, along the slope to the nearest 0.1 foot.

Payment for relocating water service pipe will be made as bid per linear foot for "Reset Water Service," complete in place. This is a contingent item of work.

Payment for relocating fire department stand pipes will be made as bid per linear foot for "Relocate Fire Department Standpipe," complete in place. This is a contingent item of work.

Payment for relocating back flow valves will be made as bid per linear foot for "Relocate Back Flow Valve," complete in place. This is a contingent item of work.

No separate payment will be made for excavation or backfill.

77-4 SANITARY SEWER SYSTEMS

77-4.01 GENERAL

Do not disturb sanitary sewers (including laterals and house connections) that do not physically conflict with the Contract work. Work around these improvements and exercise caution to prevent damage.

Unless otherwise permitted by the sanitary district, provide access to all sanitary sewer manholes and cleanouts at all time,

Comply with section 19-3.02, "Structure Excavation and Backfill" and section 71, "Existing Drainage Facilities."

77-4.02 MATERIALS

Comply with the material specifications of the sanitary district and the California plumbing code as adopted by Alameda County.

At no additional expense to the Agency, furnish cast iron pipe or special fittings where required by the sanitary district or plumbing code.

77-4.03 CONSTRUCTION

Adjust or relocate sanitary sewers (including laterals and house connections) that physically conflict with the proposed location of improvements to be placed under this Contract.

Comply with the construction specifications of the sanitary district.

Upon written approval of the Engineer and the sanitary district, you may remove and replace sewers for your convenience and at your expense.

When removing sewers, you must provide a discharge point for the sewage. Discharge of sewage into the excavation is prohibited.

Repair all sewer damage caused by your operations at your expense.

77-4.04 PAYMENT

Only sanitary sewer pipes that have been relocated because of a physical conflict with proposed improvements will be measured and paid for. The quantities of pipe to be paid for will be determined by measuring the pipe, complete in place, along the slope to the nearest 0.1 foot.

Payment for relaying sanitary sewers will be made as bid per linear foot for Relay Sanitary Sewer, complete in place. This is a contingent item of work.

77-5 BUS STOP SHELTERS

Not Used

DIVISION IX TRAFFIC CONTROL DEVICES

Replace section 82 with:

82 SIGNS AND MARKERS

82-1 GENERAL

82-1.01 GENERAL

82-1.01A Summary

Section 82-1 includes general specifications for fabricating and installing sign panels and markers and constructing roadside signs.

Signs and markers must comply with the *California MUTCD*, *California Sign Specifications*, and the FHWA publication *Standard Highway Signs and Markings*. For the *California Sign Specifications*, go to the Caltrans Traffic Operations website.

82-1.02 MATERIALS

Not Used

82-1.03 CONSTRUCTION

Not Used

82-1.04 PAYMENT

Not Used

82-2 SIGN PANELS

82-2.01 GENERAL

82-2.01A Summary

Section 82-2 includes specifications for furnishing sign panels.

Furnishing sign panels includes fabricating and installing sign panels.

82-2.01B Definitions

background: Dominant sign color.

legend: Letters, numerals, tildes, bars, arrows, route shields, symbols, logos, borders, artwork, and miscellaneous characters that are intended to convey specific meanings on traffic signs.

82-2.01C Submittals

Submit a certificate of compliance for:

1. Aluminum sheeting
2. Retroreflective sheeting
3. Color imaging methods and film
4. Protective-overlay film

Upon request, submit test samples of sign panels and materials at various stages of production. The samples must be at least 12 by 12 inches and include the background material and legend.

At least 15 days before starting sign fabrication, submit at least 3 copies of your QC plan for sign panels. The QC plan must include:

1. Contact information for the person responsible for sign QC
2. Acceptance criteria for incoming raw materials at the fabrication plant
3. Type, method, and frequency of QC testing at the fabrication plant
4. Types and brand names of retroreflective sheeting
5. List of the retroreflective sheeting manufacturer's approved process colors, protective overlay film, and black nonreflective film, including the manufacturer's name and product name for each item
6. Manufacturer's installation and splicing instructions for the retroreflective sheeting
7. Manufacturer's instructions for cleaning each product

8. Method of packaging, transporting, and storing signs

82-2.01D Quality Assurance

The Agency may inspect signs at the fabrication plant or the job site. The Agency rejects formed panel signs with holes that are slanted or incorrectly spaced. The Engineer will reject damaged signs, defective signs, and signs with spelling errors before or after installation.

~~The Agency rejects a laminated panel if a 0.010 inch thick by 1/2 inch wide feeler gauge can be inserted to a depth of more than 1/2 inch between the extruded aluminum frame and the aluminum sheeting.~~

If instrumental testing under ASTM D4956 is disputed, the Engineer's visual inspection will determine the color of the retroreflective sheeting, screened process colors, and film.

82-2.02 MATERIALS**82-2.02A General**

A sign panel must be produced at a fabrication plant.

The sign must be imprinted with the following information:

~~1. Phrase Property of the State of California~~

- ~~2.~~ 1. Sign fabricator's name
- ~~3.~~ 2. Month and year of fabrication
- ~~4.~~ 3. Type of retroreflective sheeting
- ~~5.~~ 4. Sheeting manufacturer's identification and lot number for the retroreflective sheeting

The sign information must:

1. Be imprinted in 1/4-inch upper-case letters and numerals on the back, lower right of each sign panel such that it will not be blocked by a sign post or mounting frame
2. Be imprinted at the fabrication plant by die-stamping on aluminum panels or by an equivalent method for fiberglass-reinforced plastic signs, such as affixing a die-stamped aluminum tag
3. Not be painted, screened, inked, or engraved
4. Be imprinted such that it does not damage the face of the sign

For a sign composed of multiple panels, the legend must be placed across joints such that it does not affect the size, shape, spacing, and appearance of the legend on the assembled sign.

~~For a formed panel sign, the retroreflective sheeting for the background and legend must be wrapped around the interior vertical edges of each panel.~~

A sign with a protective-overlay film must be marked at the fabrication plant with a 3/8-inch-diameter dot. The dot must be placed on the lower border of the sign before applying the protective-overlay film. The fabricator determines the application method and exact location of the dot except the dot must not be placed on the legend or near bolt holes. The dot must be black if placed on a white border and white if placed on a black border.

The exposed portion of the mounting hardware on the sign face, including rivets used to attach sheeting to framing members, must have a factory- or field-applied finish that closely matches the color of the background and legend of the sign face.

The face of a fabricated sign must be uniform, flat, smooth, and free from defects, scratches, chips, wrinkles, gel, hard spots, streaks, extrusion marks, and air bubbles. The front, back, and edges of sign panels must not have bends, router chatter marks, burns, sharp edges, loose rivets, delaminated skins, excessive adhesive over-spray, or aluminum marks.

Protect, transport, and store sign panels fabricated with screened-process colors under the retroreflective sheeting manufacturer's instructions.

Transport sign panels such that the faces of the panels are protected from damage and weather. Ship panels on pallets, in crates, or in tier racks. Ship panels vertically on edge, not stacked horizontally. Place padding and protective materials between the panels as necessary. Keep panels dry during transit.

Do not store sign panels directly on the ground. Keep sign panels dry at all times and store the panels:

1. In a dry environment
2. On edge vertically whether indoors or outdoors
3. In enclosed, climate-controlled trailers or containers in areas of high heat and humidity
4. Indoors whenever the panels will be stored more than 30 days

82-2.02B Aluminum Sheeting

A sign panel must be fabricated from aluminum sheeting of an alloy and temper complying with ASTM B209.

The aluminum sheeting must be pretreated for corrosion resistance as specified in ASTM B449. The surface of the sheeting must be cleaned, deoxidized, and coated with a light, tightly-adherent chromate conversion coating free from powdery residue. The conversion coating must be Class 2 with a weight from 10 to 35 mg/sq ft and an average weight of 25 mg/sq ft. After the cleaning and coating process, the aluminum sheeting must be protected from exposure to grease, oils, dust, and contaminants.

The aluminum sheeting must be free from buckles, warps, dents, cockles, burrs, and other defects resulting from fabrication.

The base plate for standard route markers must be die cut.

82-2.02C Retroreflective Sheeting

Retroreflective sheeting used for the background and legend must comply with ASTM D4956 and must be on the [Authorized Material List](#) for signing and delineation materials.

Use Type XI retroreflective sheeting for all sign panels, except those of construction area signs and parking signs. Parking signs must use Type IX or higher. Type III, IV, VIII, IX, and XI retroreflective sheeting must have Class 1, 3, or 4 adhesive backing. ~~Type II retroreflective sheeting may have Class 1, 2, 3, or 4 adhesive backing.~~ The adhesive backing must be pressure sensitive and fungus resistant.

Retroreflective sheeting must be applied to sign panels at the fabrication plant under the retroreflective sheeting manufacturer's instructions without appreciable stretching, tearing, or other damage.

The orientation of the legend must comply with the retroreflective sheeting manufacturer's instructions.

The retroreflective sheeting on a sign panel with a minor dimension of 48 inches or less must be a single, contiguous sheet without splices except for the splices produced during the manufacture of the retroreflective sheeting. A sign panel with a minor dimension greater than 48 inches may have 1 horizontal splice in the retroreflective sheeting other than the splices produced during the manufacture of the retroreflective sheeting.

Unless the retroreflective sheeting manufacturer's instructions require a different method, splices in the retroreflective sheeting must overlap by at least 1 inch. The retroreflective sheeting on either side of a splice must not exhibit a color difference under incident and reflected light.

82-2.02D Color Imaging Methods and Film

The material used for color imaging methods, film, and protective-overlay must be recommended by the retroreflective sheeting manufacturer.

Color retroreflective sheeting must be used for the background.

Signs with green, red, blue, or brown backgrounds may use reverse-screened-process color on white retroreflective sheeting for the background color. The coefficient of retroreflection must be at least 70 percent of the coefficient of retroreflection specified in ASTM D4956 for the corresponding color of retroreflective sheeting.

The sign must have outdoor weatherability characteristics equivalent to those specified for the corresponding color of retroreflective sheeting in ASTM D4956.

82-2.02E Single-Sheet Aluminum Panels

The aluminum sheeting for ~~framed and~~ unframed panels must be aluminum alloy 6061-T6 or 5052-H38.

A single-sheet aluminum panel must not have a vertical splice in the aluminum sheeting. A panel with a depth greater than 48 inches may have 1 horizontal splice in the sheeting.

~~For a framed panel, the framing members must be aluminum channel or rectangular aluminum tubing. The lengths of the framing members must be within $\pm 1/8$ inch of the lengths shown.~~

~~Aluminum channels or rectangular aluminum tubing must be welded together using the inert gas shielded arc welding process and E4043 aluminum electrode filler wires. The filler diameter must be equal to the wall thickness of the smallest welded channel or tubing.~~

~~The aluminum sheeting must be attached to the frame with 3/16 inch diameter rivets. The rivets must be placed at least 1/2 inch from the web channel edges. The rivets must be made of aluminum alloy 5052 and be anodized or treated with a conversion coating to prevent corrosion.~~

A fabricated single-sheet, aluminum panel must be within $\pm 1/8$ inch of the dimensions shown. The panel must be flat to within $\pm 1/32$ in/ft of the panel dimensions as measured by a straightedge placed in any direction across the plane of the panel.

82-2.02F Fiberglass-Reinforced Plastic Panels

Not Used

82-2.02G Laminated Panels

Not Used

82-2.03 CONSTRUCTION

82-2.03A General

Deliver sign panels to the job site with the background and legend permanently affixed to the panels.

Do not chip or bend sign panels.

Immediately replace sign panels exhibiting damage or flaws, including a significant color difference between daytime and nighttime.

Obtain authorization before repairing sign panels at the job site.

Use the following hardware to mount the type of sign panel shown:

1. Lag screws, nuts, bolts, and washers for roadside signs
- ~~2. Braces and wood block spacers for roadside signs~~
- ~~3. Type A-1 and Type A-2 mounting hardware for overhead laminated panel signs~~
- ~~4. Type A-3 mounting hardware for overhead formed panel signs~~

82-2.03B Laminated Panels

Not Used

82-2.04 PAYMENT

Not Used

82-3 ROADSIDE SIGNS

82-3.01 GENERAL

82-3.01A Summary

Section 82-3 includes specifications for constructing roadside signs.

Roadside signs include Type N (CA), Type P (CA), and Type R (CA) marker panels.

82-3.01B Definitions

roadside sign: Traffic sign with 1 or more sign panels attached to a supporting structure consisting of 1 or 2 posts, a signal standard, or a lighting standard.

82-3.01C Submittals

Not Used

82-3.01D Quality Assurance

Not Used

82-3.02 MATERIALS**82-3.02A General**

A roadside sign includes sign panels, fastening hardware, back braces, straps and saddle brackets, and frame assemblies for multiple sign panels.

The aluminum sheeting for street name sign panels must be 0.125" thick. For all other roadside sign panels, the aluminum sheeting must be 0.080" thick.

82-3.02B Metal Posts

Metal posts must be galvanized, 2 by 2 inch, perforated, square tubing. Use Unistrut Telespar or approved equal.

A mounting for a roadside sign to be installed on a barrier or railing must be fabricated from (1) welded or seamless steel pipe complying with ASTM A53/A53M, Grade B, and (2) structural steel complying with ASTM A36/A36M.

Bolted connections must comply with section 56-2.02D. Concrete anchorage devices must comply with section 75-3.

After fabrication, all metal parts for mounting a roadside sign must be galvanized under section 75-1.02B.

82-3.02C Wood Posts

Not Used

82-3.02D Laminated Wood Box Posts

Not Used

82-3.02E Sign Panel Fastening and Mounting Hardware

Frame assemblies for multiple sign installations must be fabricated from an aluminum alloy or structural steel complying with ASTM A36/A36M. Frames fabricated from structural steel must be hot-dip galvanized after fabrication.

Back braces for a sign must be made of commercial-quality, mild steel and hot-dip galvanized after fabrication.

Straps and saddle brackets for mounting sign panels on lighting standards, sign structure posts, and traffic signal standards must be stainless steel complying with ASTM A167, Type 302B. Theft-proof bolts must be stainless steel with a chromium content of at least 17 percent and a nickel content of at least 8 percent.

Bolts, except theft-proof bolts, lag screws, metal washers, and nuts must be made of commercial-quality steel and hot-dip galvanized after fabrication. Fiber washers must be commercial quality.

Galvanizing must comply with section 75-1.02B.

82-3.03 CONSTRUCTION**82-3.03A General**

~~You may cut the ends of wood posts at the job site. If cutting or boring is performed after treating posts with preservative, manually apply preservative to the cuts and holes under section 57-2.01B(3).~~

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~~Treat wood block spacers inserted between the post and sign panel on single post installations with wood preservative under section 57-2.01B(3).~~

~~If you do not immediately use laminated wood box posts, neatly stack them on dunnage.~~

~~Do not paint wood posts and block spacers unless described otherwise.~~

~~Drill 2 holes in each wood post to provide the breakaway feature shown.~~

~~Make breakaway saw cuts and holes for the saw cuts in laminated wood box posts after installation of the posts. Do not splice the posts. You may make 1 trim cut at the bottom of the post.~~

The line between the center of the top of a post and the center of the post at ground level must not deviate from a plumb line by more than 0.02 foot in 10 feet.

~~Backfill the space around wood posts with earth or sand that is free of rocks or other deleterious material. Backfill around laminated wood box posts with granular material. Place the backfill material in layers approximately 1/3 foot thick. Moisten and thoroughly compact each layer.~~

Backfill the space around metal posts with minor concrete that contains at least 470 pounds of cementitious material per cubic yard.

Unless surplus excavated material is hazardous, uniformly spread it along the adjacent roadway where designated by the Engineer.

82-3.03B Sign Panel Installation

Not Used

82-3.04 PAYMENT

~~An installed roadside sign consisting of one or more sign panels attached to:~~

- ~~1. 1 post is 1 measurement unit of roadside sign— one post~~
- ~~2. 2 posts is 1 measurement unit of roadside sign— two post~~
- ~~3. 1 or 2 laminated wood box posts is 1 measurement unit of install roadside sign (laminated wood box post)~~

~~The payment quantity for metal (rail mounted sign) and metal (barrier mounted sign) is determined by the scale weight of the pipe posts, base plates, anchorage assemblies, and other metal parts used to mount a roadside sign on a barrier or railing.~~

The payment quantity for roadside signs installed ~~by the strap and saddle bracket method on electrolites, sign structure posts, and traffic signal standards and~~ by the mast arm hanger method on traffic signal mast arms is the quantity of the sign panels on these elements.

Payment for furnishing sign panels is ~~not~~ included in the payment for roadside signs. Each roadside sign installation is 1 measurement unit, regardless of the supporting structure type, the number of posts or sign panels involved, or the thickness or reflectivity level of the sign panels.

82-4 SIGN OVERLAYS

Not Used

82-5 MARKERS

82-5.01 GENERAL

82-5.01A Summary

Section 82-5 includes specifications for fabricating and installing markers, including milepost markers.

82-5.01B Definitions

Reserved

82-5.01C Submittals

Submit a certificate of compliance for:

1. Metal target plates
2. Enamel coating
3. Retroreflective sheeting

82-5.01D Quality Assurance

When tested under California Test 671, the enamel coating on metal target plates must have satisfactory resistance to weathering, humidity, salt spray, and chemicals. The enamel coating must have:

1. Satisfactory adherence and impact resistance
2. Pencil lead hardness of HB minimum
3. 60-degree specular gloss of 80 percent minimum
4. Excitation purity of 3 percent maximum:
 - 4.1 As received
 - 4.2 After 1,000 hours in an artificial weathering device as specified in ASTM G155, Table X3.1, Cycle 1
5. Daylight luminous directional reflectance, Y value, of 70 minimum

The Agency may sample metal target plates for testing at the production stages for the lot and sample sizes shown in the following table:

Metal Target Plate Sampling		
Production stage	Lot size	Sample size
Finished target plates	Less than 5,000	5 target plates
	5,000–10,000	10 target plates
Flat sheet stock	10,000 sq ft or less ^a	Five 12-by-24-inch specimens
Coil stock	5,000 lb or less	Two 12-by-12-inch specimens or one 12-by-24-inch specimen

^aFlat sheet stock must be identifiable with parent coil stock.

The Agency rejects the entire lot if either of the following occurs:

1. Any sample does not comply with section 82
2. Zinc-coated steel sheets show any evidence of damage to or removal of the zinc coating

If the Agency chooses to resample, the sample size may be twice the number shown in the table titled "Metal Target Plate Sampling."

82-5.02 MATERIALS**82-5.02A General**

A marker must be on the Authorized Material List for signing and delineation materials.

82-5.02B Wood Posts

A wood post must comply with section 82-3.02C.

82-5.02C Metal Posts

Steel for a metal post must comply with ASTM A36/A36M.

A metal post must be galvanized under section 75-1.02B.

82-5.02D Flexible Posts

A flexible post must be white except where shown as yellow.

The flexible post must be free from burns, discoloration, contamination, and other objectionable marks or defects that affect appearance or serviceability.

82-5.02E Target Plates

A target plate for a Type K-1 (CA) or a Type K-2 (CA) object marker must be the same color and material as the flexible post.

A target plate for milepost marker or Type L-1 (CA) or Type L-2 (CA) object marker installed on a metal post must be manufactured from an aluminum sheet or zinc-coated steel sheet.

Galvanize steel sheets under section 75-1.02B. Zinc-coated steel sheets must comply with ASTM A653/A653M, Commercial Steel, Types A, B, and C.

The nominal thickness of a zinc-coated steel sheet must be at least 0.038 inch.

Prepare zinc-coated surfaces to produce optimum adherence of the enamel coating without damaging or removing the zinc coating.

An aluminum target plate must be aluminum alloy 3003-H14. You may use other alloys having equivalent properties if authorized.

The nominal thickness of an aluminum sheet must be at least 0.050 inch.

Prepare the aluminum sheets for the enamel coating by a suitable cleaning method to remove contaminants and by uniformly applying an acid-chromate-fluoride, acid-chromate-fluoride phosphate, or equivalent chemical anticorrosion conversion coating.

Cut the target plate to size and shape and punch the mounting bolt holes. The surfaces and edges of the plate must be free from fabrication defects.

Coat the pretreated metal target plate with an opaque white coating on both sides using a 1-coat or 2-coat system. When tested under California Test 671, the dry film for the:

1. 1-coat system must be uniform and have an average thickness of at least 0.75 mil with no individual measurement less than 0.65 mil
2. 2-coat system must consist of 0.10- to 0.20-mil-thick primer and have an average thickness of at least 0.75 mil, including primer and top coat, with no individual measurement less than 0.65 mil

If using a 1-coat painting system, fabricate a zinc-coated steel target plate, including shearing, cutting, and punching, before starting the enameling process.

The enamel coating on a metal target plate must be the product of a commercial manufacturer. Apply the enamel coating by spray, dip, roller, or continuous roller coating. You may use other methods if authorized.

The coating must be smooth and substantially free from flow lines, paint washout, streaks, blisters, and other defects that might impair serviceability or detract from the general appearance.

A finished metal target plate must not have dents or defects. The maximum edge-to-edge surface deviation from a horizontal plane must not exceed 1/8 inch.

82-5.02F Reflectors

A reflector for a marker must be made of a Type III or higher grade retroreflective sign sheeting shown on the Authorized Material List for signing and delineation materials.

82-5.02G Hardware

Use (1) 1/4-inch galvanized steel or aluminum nuts and bolts or (2) 3/16-inch blind aluminum rivets and washers to attach a target plate to a post.

Use 5/16-inch galvanized steel bolts, nuts, and washers to attach a marker panel to a post.

82-5.02H Milepost Markers

Letters and numerals on a milepost marker must be made with opaque black paint or film. The paint and film must have an equivalent outdoor weatherability as the retroreflective sheeting specified in ASTM D4956. Nonreflective, opaque, black film must be vinyl or acrylic material.

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Film for letters and numerals must be computer cut and have pressure-sensitive adhesive.

82-5.02I–82-5.02L Reserved**82-5.03 CONSTRUCTION**

Drive posts in place where soil conditions allow the driving without damage to the posts. Drill pilot holes if the ground conditions are such that the posts cannot be driven without being damaged.

Install target plates and marker panels after the posts are set in place.

After setting the posts, fill the space around them with rock-free earth. During placement, thoroughly tamp and water the fill material such that the post is held securely in position.

Unless surplus excavated material is hazardous, uniformly spread it along the adjacent roadway where designated by the Engineer.

Use stencils to paint letters and numerals on milepost markers.

Before Contract acceptance, spot paint all exposed areas where the paint is damaged and clean all exposed areas that are soiled.

82-5.04 PAYMENT

Not Used

82-6–82-8 RESERVED**82-9 EXISTING ROADSIDE SIGNS AND MARKERS****82-9.01 GENERAL**

Section 82-9 includes specifications for performing work on existing roadside signs and markers.

Work performed on existing roadside signs and markers must comply with section 15.

82-9.02 MATERIALS

Not Used

82-9.03 CONSTRUCTION**82-9.03A General**

Remove roadside signs only when replacement signs are installed or when the existing signs are no longer required for traffic. Reset or relocate each roadside sign the same day it is removed.

Reset or relocate roadside signs in conformance with Agency Standard Detail SD-700.

Salvage undamaged conforming posts and sign panels that are shown to be removed and not relocated. Single sheet aluminum signs to be salvaged must be banded on a pallet with a total weight of not more than 500 lb/pallet.

Reset or relocate roadside signs using existing posts, unless the existing post is non-conforming, damaged or otherwise unsightly. In which case, install a new conforming post.

~~If an existing post is deteriorated or broken, notify the Engineer. If ordered, use a new post.~~

~~Any new post and its installation, ordered for reasons other than damage you cause is change order work.~~

82-9.03B Installation of Sign Panels on Existing Frames

Not Used

82-9.03C Installation of Removable Sign Panel Frames

Not Used

82-9.03D Relocate Markers

Not Used

82-9.03E Reset Markers

Not Used

82-9.04 PAYMENT

~~Payment for furnishing sign panels of any type is not included in the payment for install sign panel on existing frame.~~

~~Remove sign panel and remove sign panel frame consisting of a single removable sign panel frame with attached sign panels is 1 measurement unit.~~

~~Payment for furnishing sign panels is not included in the payment for furnish removable sign panel frame with sign panels attached and install removable sign panel frame.~~

Payment for reset or relocate roadside signs includes furnishing and installing a new conforming post where necessary.

Each sign installation is 1 measurement unit, regardless of the number of posts or sign panels involved.

Replace section 84 with:

84 MARKINGS

84-1 GENERAL

84-1.01 GENERAL

Section 84-1 includes general specifications for applying and constructing markings.

Markings must comply with the CA MUTCD.

84-1.02 MATERIALS

Not Used

84-1.03 CONSTRUCTION

Not Used

84-1.04 PAYMENT

Not Used

84-2 TRAFFIC STRIPES, ~~AND~~ PAVEMENT MARKINGS AND CURB MARKINGS

84-2.01 GENERAL

84-2.01A Summary

Section 84-2 includes specifications for applying traffic stripes, ~~and~~ pavement markings and curb markings.

Traffic stripes and pavement markings must comply with ASTM D6628 for daytime and nighttime color.

Retroreflectivity must be measured under ASTM E1710 and the sampling protocol specified in ASTM D7585.

84-2.01B Definitions

pavement marking: Transverse marking which includes shoulder or gore marking, traffic island marking, word or numeral or symbol marking, arrow, limit line, stop line, yield line, crosswalk marking, speed measurement marking, speed reduction marking, speed hump marking, parking space marking, and route shield marking.

traffic stripe: Longitudinal centerline or lane line used for separating traffic lanes in the same direction of travel or in the opposing direction of travel or a longitudinal edge line marking the edge of the traveled way or the edge of a lane at a gore area separating traffic at an exit or entrance ramp. A traffic stripe is shown as a traffic line.

84-2.01C Submittals

For each lot or batch of traffic stripe material, primer, and glass beads, submit:

1. Certificate of compliance, including the material name, lot or batch number, and manufacture date
2. METS notification letter stating that the material is authorized for use, except for thermoplastic and primer
3. SDS
4. Manufacturer's Instructions

For each lot or batch of thermoplastic, submit a manufacturer's certificate of compliance and the following test results from the California Test 423:

1. Brookfield Thermosel viscosity
2. Hardness
3. Yellowness index, white only
4. Daytime luminance factor
5. Yellow color, yellow only
6. Glass bead content
7. Binder content

The date of the test must be within 1 year of use.

Submit test results for each lot of beads specifying the EPA test methods used and tracing the lot to the specific test sample. The testing for lead and arsenic content must be performed by an independent testing laboratory.

Submit the thermoplastic test stripe to the Engineer.

Submit the retroreflectivity test result within 5 days of testing the traffic stripes and pavement markings. The data must include the retroreflectivity, time, date, and GPS coordinates for each measurement.

84-2.01D Quality Assurance

84-2.01D(1) General

Reserved

84-2.01D(2) Quality Control

Before starting permanent application of methyl methacrylate and two component paint traffic stripes and pavement markings, apply a test stripe on roofing felt or other suitable material in the presence of the Engineer. The test stripe section must be at least 50 feet in length.

Upon request, apply a thermoplastic test stripe on suitable material in the presence of the Engineer during the application of thermoplastic traffic stripes or markings. The test stripe must be at least 1 foot in length.

Remove loose glass beads before measuring the retroreflectivity. Obtain authorization to proceed with the application of traffic stripes and pavement markings.

Within 30 days of application, test the traffic stripes and pavement markings under the test methods and frequencies shown in the following table:

Traffic Stripe Testing Frequency

Quality characteristic	Test method	Minimum sampling and testing frequency
Initial retroreflectivity (min, $\text{mcd}\cdot\text{m}^{-2}\cdot\text{lx}^{-1}$)	ASTM E1710	ASTM D7585 ^a
White		
Yellow		

^aUse the referee evaluation protocol for project length less than 10 miles. For project lengths greater than or equal to 10 miles, add one evaluation for every additional mile.

Verify the glass bead application rate by stabbing the glass bead tank with a calibrated rod.

84-2.01D(3) Agency Acceptance

The Engineer will perform a nighttime, drive-through, visual inspection of the retroreflectivity of the traffic stripes and pavement markings and notify you of any locations with deficient retroreflectivity. Test the retroreflectivity of the deficient areas to confirm striping and pavement markings meets the requirements.

The thermoplastic test stripe will be tested for yellow color, daytime luminance factor, and yellowness index requirements by METS.

84-2.02 MATERIALS

84-2.02A General

Reserved

84-2.02B Glass Beads

Each lot of glass beads must comply with EPA Test Method 3052 and 6010B or 6010C. Glass beads must contain less than 200 ppm each of arsenic and lead.

Type 1 glass beads must comply with AASHTO M 247.

Type 2 glass beads must comply with AASHTO M 247. At least 75 percent of the beads by count must be true spheres that are colorless and do not exhibit dark spots, air inclusions, or surface scratches when viewed under 20X magnification.

High-performance glass beads must be on the Authorized Material List for high-performance glass beads.

Large-gradation glass beads must be on the Authorized Material List for two component traffic paint.

Glass beads for methyl methacrylate must be on the Authorized Material List for methyl methacrylate traffic striping and pavement marking.

Glass beads for paint must comply with State Specification 8010-004.

Glass beads must be surface treated, according to the bead and the material manufacturer's instructions, to promote adhesion with the specified material.

84-2.02C Thermoplastic

Thermoplastic must comply with State Specification PTH-02HYDRO, or PTH-02ALKYD.

Sprayable thermoplastic must comply with State Specification PTH-02SPRAY.

Each lot or batch of thermoplastic must be tested under California Test 423.

84-2.02D Methyl Methacrylate

Methyl methacrylate traffic paint must:

1. Be on the Authorized Material List for methyl methacrylate traffic striping and pavement marking
2. Be Category 2

84-2.02E Traffic Striping and Pavement Marking Tape

Traffic striping and pavement marking tape must be on the Authorized Material List for signing and delineation materials.

White tape must have an initial retroreflectivity of a minimum 700 mcd/m².

Yellow tape must have an initial retroreflectivity of a minimum 500 mcd/m².

When contrast is required for traffic striping and pavement marking tape, the tape must be pre-formed and retroreflective, consisting of a white film with retroreflective beads and a contrasting black film border. The contrasting black border must be a nonreflective film bonded on each side of the white film to form a continuous roll. Each black border must be a minimum of 2 inches wide. The width of the tape must be at least 4 inches wider than the stripe width.

84-2.02F Two-Component Paint

Two-component traffic paint must be on the Authorized Material List for two component traffic paint.

84-2.02G Paint

Paint must comply with the requirements shown in following table:

Paint Specifications		
Paint type	Color	Specification
Waterborne traffic line	White, yellow, and black	State Specification PTWB-01R2
Waterborne traffic line for the international symbol of accessibility and other curb markings	Blue, red, and green	Federal Specification TT-P-1952E

84-2.02H–84-2.02L Reserved**84-2.03 CONSTRUCTION****84-2.03A General**

Establish the alignment for traffic stripes and the layouts for pavement markings with a device or method that will not conflict with other traffic control devices.

Protect existing retroreflective pavement markers during work activities.

Remove existing pavement markers that are coated or damaged by work activities and replace with an equivalent marker on the Authorized Material List for signing and delineation materials.

A completed traffic stripe or pavement marking must:

1. Have well defined edges
2. Be uniform
3. Be free from runs, bubbles, craters, drag marks, stretch marks, and debris

A completed traffic stripe must:

1. Be straight on a tangent alignment
2. Be a true arc on a curved alignment
3. Not deviate from the width shown by more than:
 - 3.1. 1/4 inch on a tangent alignment
 - 3.2. 1/2 inch on a curved alignment

The length of the gaps and individual stripes that form a broken traffic stripe must not deviate by more than 2 inches from the lengths shown. The gaps and stripes must be uniform throughout the entire length of the traffic stripe.

Protect newly placed traffic stripes and pavement markings from traffic and work activities until the traffic stripes and pavement markings are dry or hard enough to bear traffic.

Use mechanical methods to remove dirt, contaminants, and loose material from the pavement surface before applying the traffic stripe or pavement marking.

Use abrasive blast cleaning to remove laitance and curing compound from the surface of new concrete pavement before applying the traffic stripe or pavement marking.

Construct recesses as shown in the following table:

Recess Depth Requirements

Material	Requirement	
	Depth (mils)	Depth (in)
Thermoplastic	375	3/8
Two component traffic paint	250	1/4
Methyl methacrylate traffic paint	250	1/4

Construct recesses for double traffic stripes in a single pass.

Before applying the traffic stripes and pavement markings:

1. Allow wet ground recesses to dry a minimum of 24 hours
2. Remove all powdery residue from dry recess
3. Keep the recesses dry and free from debris

Apply traffic stripes and pavement markings before the end of the same work shift.

84-2.03B Application of Traffic Stripes and Pavement Markings**84-2.03B(1) General**

Apply material for a pavement marking with a stencil or a preformed marking.

Immediately remove drips, overspray, improper markings, or material tracked by traffic, using an authorized method.

Apply a traffic stripe or a pavement marking only to a clean, dry surface during a period when the pavement surface temperature is above 50 degrees F.

Apply traffic stripe or pavement marking and glass beads in a single pass. You may apply the glass beads by hand on pavement markings.

Embed glass beads to a depth of 1/2 their diameters.

Distribute glass beads uniformly on traffic stripe and pavement markings.

Glass beads with integral color must match the color of the stripe or pavement marking.

Apply glass beads with two separate applicator guns when two gradations are specified.

Allow enough overlap distance between new and existing striping patterns to ensure continuity at the start and end of the transition.

The retroreflectivity of applied traffic stripes and pavement markings must comply with the requirements shown in the following table:

Retroreflectivity Requirements		
Traffic stripe material	White (min, mcd·m ⁻² ·lx ⁻¹)	Yellow (min, mcd·m ⁻² ·lx ⁻¹)
Paint	250	125
Thermoplastic	250	125
Thermoplastic with wet night enhanced visibility	700	500
Two component	250	125
Methyl methacrylate	500	300
Tape	700	500

84-2.03B(2) Thermoplastic**84-2.03B(2)(a) General**

Apply primer or surface preparation adhesive under the manufacturer's instructions:

1. To all roadway surfaces except for asphaltic surfaces less than 6 months old
2. At a minimum rate of 1 gallon per 300 square feet
3. To allow time for the thermoplastic primer to dry and become tacky before application of the thermoplastic

Do not thin the primer.

Preheat thermoplastic using preheaters with mixers having a 360-degree rotation.

Apply thermoplastic in a single uniform layer by spray or extrusion methods.

Completely coat and fill voids in the pavement surface with the thermoplastic.

Apply recessed thermoplastic at a thickness so that the top is 0 to 1/16 inch below the pavement surface.

84-2.03B(2)(b) Extruded Thermoplastic

Apply extruded thermoplastic at a temperature of 400 to 425 degrees F or as recommended by the manufacturer.

Apply extruded thermoplastic for a traffic stripe at a rate of at least 0.36 lb of thermoplastic per foot of 6-inch-wide solid stripe. The applied traffic stripe must be at least 0.060 inch thick.

Apply extruded thermoplastic pavement markings at a thickness from 0.100 to 0.150 inch.

Apply Type 2 glass beads to the surface of the molten thermoplastic at a rate of at least 8 lb of beads per 100 sq ft.

84-2.03B(2)(c) Sprayable Thermoplastic

Apply sprayable thermoplastic at a temperature of 350 to 400 degrees F.

Apply sprayable thermoplastic for a traffic stripe at a rate of at least 0.24 lb of thermoplastic per foot of 6-inch-wide solid stripe. The applied stripe must be at least 0.040 inch thick.

84-2.03B(2)(d) Thermoplastic with Enhanced Wet-Night Visibility

Apply a thermoplastic traffic stripe or pavement marking with enhanced wet-night visibility in a single pass and in the following order:

1. Uniform layer of extruded thermoplastic
2. Layer of high-performance glass beads
3. Layer of Type 2 glass beads

Apply thermoplastic with enhanced wet-night visibility at a maximum speed of 8 mph.

Apply thermoplastic with enhanced wet-night visibility for a traffic stripe at a rate of at least 0.47 lb of thermoplastic per foot of 6-inch-wide solid stripe. The applied stripe must be at least 0.090 inch thick.

Apply thermoplastic with enhanced wet-night visibility for a pavement marking at a rate of at least 1.06 lb of thermoplastic per square foot of marking. The applied pavement marking must be at least 0.100 inch thick.

Apply high-performance glass beads at a rate of at least 6 lb of glass beads per 100 sq ft of stripe or marking. Apply Type 2, glass beads at a rate of at least 8 lb of glass beads per 100 sq ft of stripe or marking.

84-2.03B(3) Methyl Methacrylate

Apply the methyl methacrylate when the pavement surface and atmospheric temperatures are from 40 to 104 degrees F.

Apply methyl methacrylate paint at a minimum thickness of 0.090 inch.

Apply recessed methyl methacrylate paint at a minimum thickness of 0.200 inch.

Apply the glass beads recommended by the methyl methacrylate manufacturer.

84-2.03B(4) Traffic Striping and Pavement Marking Tape

Do not use traffic stripe and pavement marking tape on existing open graded friction course or chip seal.

Prepare pavement surface and use primer under the traffic tape manufacturer's written instructions. Apply tape to clean and dry pavement surface. Roll or tamp the traffic tape in place.

84-2.03B(5) Two-Component Paint

Apply a two-component painted traffic stripe or pavement marking in a single pass and in the following order:

1. Coat of two-component paint
2. Application of large gradation glass beads recommended by the two-component paint manufacturer
3. Application of Type 1 glass beads

Apply two-component paint when the pavement surface temperature is above 39 degrees F and the atmospheric temperature is above 36 degrees F. The temperature of the paint must comply with the paint manufacturer's instructions.

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Apply two-component paint and glass beads at a maximum speed of 10 mph.

Apply large-gradation glass beads at a minimum rate of 11.7 lb of beads per gallon of paint.

Apply Type 1 glass beads at a minimum rate of 8.3 lb of beads per gallon of paint.

Apply two-component paint for the traffic stripes and pavement markings at the thickness and application rates shown in the following table:

Type of pavement	Stripe thickness (min, inch)	Application rate (min, sq ft/gal)
HMA open graded/chip seal	0.025	64
HMA dense graded	0.020	80
Concrete	0.020	80

Apply recessed two-component paint at a thickness between 0.020 and 0.025 inch.

84-2.03B(6) Paint

Do not apply paint if:

1. Fresh paint could become damaged by rain, fog, or condensation
2. Atmospheric temperature could drop below 50 degrees F during the drying period

Do not thin paint.

Use mechanical means to paint traffic stripes and pavement markings and to apply glass beads for traffic stripes.

The striping machine must be capable of superimposing successive coats of paint on the 1st coat and on existing stripes at a minimum speed of 5 mph.

Where the configuration or location of a traffic stripe is such that the use of a striping machine is not practicable, you may apply the traffic paint and glass beads by other methods and equipment if authorized.

Apply traffic stripes and pavement markings in 1 coat on existing pavement surfaces, at an approximate rate of 107 sq ft/gal.

Apply traffic stripes and pavement markings in 2 coats on a new pavement surface. The 1st coat of paint must be dry before applying the 2nd coat.

Apply 2-coat paint at the approximate rate of 215 sq ft/gal for each coat.

Paint a 1-coat, 3-inch-wide black stripe between the two 6-inch-wide yellow stripes of a double traffic stripe. If the two 6-inch-wide yellow stripes are applied in 2 coats, apply the black stripe concurrently with the 2nd coat of the yellow stripes.

On 2-lane highways:

1. If the 1st coat of the centerline stripe is applied in the same direction as increasing post miles, use the right-hand spray gun of the 3 spray guns to apply a single yellow stripe
2. If the 1st coat of the centerline stripe is applied in the same direction as decreasing post miles, use the left-hand spray gun of the 3 spray guns to apply a single yellow stripe
3. Apply the 2nd coat of centerline striping in the opposite direction of the 1st coat

Apply glass beads at an approximate rate of 5 lb of beads per gallon of paint.

Verify the application rate of paint by stabbing the paint tank with a calibrated rod. If the striping machine has paint gauges, the Engineer may measure the volume of paint using the gauges instead of stabbing the paint tank with a calibrated rod.

84-2.03B(7) Contrast Striping

Contrast striping consists of black striping placed on each side of a white stripe.

You may use permanent tape instead of paint or thermoplastic.

Apply contrast stripe paint in one coat.

Do not use glass beads or other reflective elements in contrast striping material.

84-2.03B(8)–84-2.03B(10) Reserved**84-2.04 PAYMENT**

The payment quantity for a traffic stripe is the length measured along the line of the traffic stripe without deductions for gaps in the broken traffic stripe.

The payment quantity for a pavement marking is the area covered.

A double traffic stripe consisting of two 6-inch-wide yellow stripes are measured as 2 traffic stripes except for painted traffic stripes and sprayable thermoplastic traffic stripes. A double sprayable thermoplastic traffic stripe consisting of two 6-inch-wide yellow stripes are measured as single traffic stripe.

A double painted traffic stripe consisting of two 6-inch-wide yellow stripes separated by a 3-inch-wide black stripe is measured as a single traffic stripe.

The payment quantity for contrast striping is the length measured along the line of the traffic stripe without deductions for gaps in the broken traffic stripe.

The payment quantity for a curb marking is the length measured along the curb portion that is painted.

84-3 CONTRAST TREATMENT**84-3.01–84-3.10 RESERVED****84-4–84-7 RESERVED****84-8 RUMBLE STRIPS**

Not Used

84-9 EXISTING MARKINGS**84-9.01 GENERAL****84-9.01A Summary**

Section 84-9 includes specifications for removing existing markings.

Work performed on existing markings must comply with section 15.

84-9.01B Definitions

Reserved

84-9.01B Submittals

Submit your proposed method for removing traffic stripes and pavement markings at least 7 days before starting the removal work. Allow 2 business days for the review.

84-9.02 MATERIALS

Not Used

84-9.03 CONSTRUCTION**84-9.03A General**

Remove existing traffic stripes before making any changes to the traffic pattern.

Remove existing traffic stripes and pavement markings before applying the following materials:

1. Traffic stripe and pavement marking tape

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2. Two component traffic stripes and pavement markings
3. Methyl methacrylate traffic stripes and pavement markings

Remove contrast stripes, traffic stripes and pavement markings, including any paint in the gaps, by methods that do not remove pavement to a depth of more than 1/8 inch.

Remove pavement markings such that the old message cannot be identified. Make any area removed by grinding rectangular. Water must not puddle in the ground areas. Fog seal ground areas on asphalt concrete pavement.

Sweep up or vacuum any residue before it can (1) be blown by traffic or wind, (2) migrate across lanes or shoulders, or (3) enter a drainage facility.

84-9.03B Remove Traffic Stripes and Pavement Markings Containing Lead

Yellow traffic paint used prior to 1997 and yellow thermoplastic material used prior to 2006 are assumed to contain high concentrations of lead.

Section 84-9.03B applies if the Bid Item List contains one or more of the following items:

1. Remove Yellow Painted Traffic Stripe (Hazardous Waste)
2. Remove Yellow Painted Pavement Marking (Hazardous Waste)
3. Remove Yellow Thermoplastic Traffic Stripe (Hazardous Waste)
4. Remove Yellow Thermoplastic Pavement Marking (Haz. Waste)

Comply with section 14-11.12, "Removal of Yellow Traffic Stripe and Pavement Marking with Hazardous Waste Residue."

84-9.03C–84-9.03J Reserved

84-9.04 PAYMENT

The payment quantity for remove traffic stripe is the measured length multiplied by:

1. 0.67 for a single 4-inch-wide traffic stripe
2. 1.34 for a single 8-inch-wide traffic stripe
3. 2 for a double traffic stripe

The payment quantity for remove traffic stripe does not include the gaps in broken traffic stripes. Payment for removal of paint evident in a gap is included in the payment for remove traffic stripe of the type involved.

If no bid item is shown on the Bid Item List for remove pavement marking, remove pavement marking is paid for as remove traffic stripe of the types shown in the Bid Item List and the payment quantity for 1 square foot of pavement marking is 2 linear feet.

84-10–84-15 RESERVED

DIVISION X ELECTRICAL WORK

Replace section 86 with:

86 GENERAL

86-1.01 GENERAL

86-1.01A Summary

Section 86 includes general specifications for furnishing electrical equipment and materials.

Electrical equipment and materials must comply with part 4 of the *California MUTCD* and 8 CA Code of Regs, chapter 4, subchapter 5, "Electrical Safety Orders."

Galvanized equipment and materials must comply with section 75-1.02B.

86-1.01B Definitions

accessible pedestrian signal: Accessible pedestrian signal as defined in the *California MUTCD*.

accessible walk indication: Activated audible and vibrotactile action during the walk interval.

actuation: Actuation as defined in the *California MUTCD*.

ambient sound level: Background sound level in dB at a given location.

ambient sound sensing microphone: Microphone that measures the ambient sound level in dB and automatically adjusts the accessible pedestrian signal speaker's volume.

audible speech walk message: Audible prerecorded message that communicates to pedestrians which street has the walk interval.

CALiPER: Commercially Available LED Product Evaluation and Reporting. A U.S. Department of Energy program that individually tests and provides unbiased information on the performance of commercially available LED luminaires and lights.

controller assembly: Assembly for controlling a system's operations, consisting of a controller unit and auxiliary equipment housed in a waterproof cabinet.

controller unit: Part of the controller assembly performing the basic timing and logic functions.

correlated color temperature: Absolute temperature in kelvin of a blackbody whose chromaticity most nearly resembles that of the light source.

detector: Detector as defined in the *California MUTCD*.

electrolier: Assembly of a lighting standard and luminaire.

flasher: Device for opening and closing signal circuits at a repetitive rate.

illuminance gradient: Ratio of the minimum illuminance on a 1-foot square of sign panel to that on an adjacent 1-foot square of sign panel.

inductive loop detector: Detector capable of being actuated by an inductance change caused by a vehicle passing or standing over the loop. An inductive loop detector includes a loop or group of loops installed in the roadway and a lead-in cable installed and connected inside a controller cabinet.

junction temperature: Temperature of the electronic junction of the LED device. The junction temperature is critical in determining photometric performance, estimating operational life, and preventing catastrophic failure of the LED.

L70: Extrapolated life in hours of the luminaire when the luminous output depreciates 30 percent from the initial values.

lighting standard: Pole and mast arm supporting the luminaire.

link: Part of a system which provides a data connection between a transmitter and receiver.

LM-79: Test method from the Illumination Engineering Society of North America specifying the test conditions, measurements, and report format for testing solid state lighting devices, including LED luminaires.

LM-80: Test method from the Illumination Engineering Society of North America specifying the test conditions, measurements, and report format for testing and estimating the long-term performance of LEDs for general lighting purposes.

luminaire: Assembly that houses the light source and controls the light emitted from the light source.

mid-span access method: Procedure in which fibers from a single buffer tube are accessed and spliced to a multi buffer tube cable without cutting the unused fibers in the buffer tube, or disturbing the remaining buffer tubes in the cable.

National Voluntary Laboratory Accreditation Program: U.S. Department of Energy program that accredits independent testing laboratories.

optical time domain reflectometer: Fiber optic test equipment that is used to measure the total amount of power loss between two points and over the corresponding distance. It provides a visual and printed display of the relative location of system components such as fiber sections, splices and connectors as well as the losses that are attributed to each component and or defects in the fiber.

pedestrian change interval: Pedestrian change interval as defined in the *California MUTCD*.

powder coating: Coating applied electrostatically using exterior-grade, UV-stable, polymer powder.

power factor: Ratio of the real power component to the complex power component.

power meter: Portable fiber optic test equipment that, when coupled with a light source, is used to perform end-to-end attenuation testing. Its display indicates the amount of power injected by the light source at the designed wavelength of the system under testing that arrives at the receiving end of the link.

pretimed controller assembly: Assembly operating traffic signals under a predetermined cycle length.

programming mechanism: Device to program the accessible pedestrian signal operation.

pull box: Box with a cover that is installed in an accessible place in a conduit run to facilitate the pulling in of wires or cables.

push button information message: Push button information message as defined in the *California MUTCD*.

push button locator tone: Push button locator tone as defined in the *California MUTCD*.

segment: Continuous cable terminated by 2 splices, 2 connectors or 1 splice and 1 connector.

signal face: Signal face as defined in the *California MUTCD*.

signal head: Signal head as defined in the *California MUTCD*.

signal indication: Signal indication as defined in the *California MUTCD*.

signal section: Signal section as defined in the *California MUTCD*.

signal standard: Pole with or without mast arms carrying 1 or more signal faces.

street side lumens: Lumens from a luminaire directed to light up areas between the fixture and the roadway, such as traveled ways and freeway lanes.

surge protection device: Subsystem or component that protects equipment against short-duration voltage transients in power line.

total harmonic distortion: Ratio of the rms value of the sum of the squared individual harmonic amplitudes to the rms value of the fundamental frequency of a complex waveform.

traffic-actuated controller assembly: Assembly for operating traffic signals under the varying demands of traffic as registered by detector actuation.

traffic phase: Traffic phase as defined in the *California MUTCD*.

vehicle: Vehicle as defined in the *California Vehicle Code*.

vibrotactile pedestrian device: Vibrotactile pedestrian device as defined in the *California MUTCD*.

86-1.01C Submittals

86-1.01C(1) General

Within ~~45~~ **10** days after Contract approval, submit a list of equipment and materials you propose to install.

Submit the list before shipping equipment and materials to the job site. The list must include:

1. Manufacturer's name
2. Make and model number
3. Month and year of manufacture
4. Lot and serial numbers
5. Contract number
6. Your contact information

Submit confirmation of the vendor's acceptance of the order for the electrical equipment and materials as an informational submittal.

Submit 3 sets of computer-generated, schematic wiring diagrams for each cabinet.

Diagrams, plans, and drawings must be prepared using graphic symbols in IEEE 315, "Graphic Symbols for Electrical and Electronic Diagrams."

~~Submit a schedule of values within 15 days after Contract approval.~~

~~Do not include costs for the traffic control system in the schedule of values.~~

Submit a manufacturer's maintenance manual or combined maintenance and operation manual as an informational submittal. The manual must have a master item index that includes:

1. Specifications
2. Design characteristics
3. General operation theory
4. Function of all controls
5. Troubleshooting procedure
6. Parts list, descriptions, stock numbers, and settings
7. Block circuit diagram
8. Layout of components
9. Schematic diagrams

86-1.01C(2) Pull Boxes

Submit the manufacturer's installation instructions for pull boxes, including:

1. Quantity and size of entries that can be made without degrading the strength of the pull box below the load rating
2. Locations where side entries can be made
3. Acceptable method for creating the entry

Submit load-rating test reports for pull boxes from a laboratory that is accredited to International Standards Organization/International Electrotechnical Commission 17025 by the American Association for Laboratory Accreditation (A2LA) or the ANSI-ASQ National Accreditation Board (ANAB).

86-1.01C(3) Luminaires

Submit for a luminaire:

1. Maximum power in watts
2. Maximum designed junction temperature
3. Heat sink area in square inches
4. Designed junction-to-ambient thermal resistance calculation with thermal resistance components clearly defined
5. L70 in hours when extrapolated for the average nighttime operating temperature
6. Life expectancy based on the junction temperature
7. Manufacturer's data sheet for the power supply, including the rated life

Submit the manufacturer's QC test data for luminaires as an informational submittal.

86-1.01C(4) Reserved**86-1.01C(5) Service Equipment Enclosures**

Not Used

86-1.01C(6) Signal Heads

Not Used

86-1.01C(7) LED Signal Modules

Not Used

86-1.01C(8) Visors

Not Used

86-1.01C(9) LED Countdown Pedestrian Signal Face Modules

Not Used

86-1.01C(10) Accessible Pedestrian Signals

Not Used

86-1.01D Quality Assurance**86-1.01D(1) General**

Electrical equipment must comply with one or more of the following standards:

1. ANSI
2. ASTM
3. EIA/ECIA
4. NEMA
5. NETA
6. UL/NRTL
7. TIA

Materials must comply with:

1. FCC rules
2. ITE standards
3. NEC
4. California Electrical Code

86-1.01D(2) Source Quality Control

Service equipment enclosures ~~and cabinets~~ must be inspected and tested at the source.

86-1.01D(3) Agency Acceptance

Deliver material and equipment for testing to the Alameda County Traffic Signal Shop located at 951 Turner Court in Hayward METS.

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Allow 30 days for testing. The Agency notifies you when testing is complete.

If the Agency accepts the material or equipment, you must pick it up from the test site and deliver it to the job site.

If the Agency rejects material or equipment, remove it within 5 business days after you are notified it is rejected. If it is not removed within that period, the Agency may remove it and ship it to you and deduct the costs of labor, material and shipping.

Resubmit a new sample and allow 30 days for retesting. The retesting period starts when the replacement material or equipment is delivered to [the Traffic Signal Shop METS](#).

86-1.02 MATERIALS

86-1.02A General

Anchor bolts, anchor bars or studs, and nuts and washers must comply with section 75-1.02.

Bolt threads must accept galvanized standard nuts without requiring tools or causing removal of protective coatings.

86-1.02B Conduit and Accessories

86-1.02B(1) General

Conduit and fittings must comply with the requirements shown in the following table:

Conduit and Fitting Requirements	
Type	Requirement
1	Must be hot-dip galvanized rigid steel complying with UL 6 and ANSI C80.1. The zinc coating must comply with copper sulfate test requirements in UL 6. Fittings must be electrogalvanized and certified under UL 514B.
2	Must comply with requirements for Type 1 conduit and be coated with PVC or polyethylene. The exterior thermoplastic coating must have a minimum thickness of 35 mils. The internal coating must have a minimum thickness of 2 mils. Coated conduit must comply with NEMA RN 1, or NRTL PVC-001.
3	Must be Type A, extruded, rigid PVC conduit complying with UL 651 or must be HDPE conduit complying with UL 651A.
4	Must have an inner, flexible metal core covered by a waterproof, nonmetallic, sunlight-resistant jacket, and must be UL listed for use as a grounding conductor. Fittings must be certified under UL 514B.
5	Must be intermediate steel complying with UL 1242 and ANSI C80.6. The zinc coating must comply with copper sulfate test requirements specified in UL 1242. Fittings must be electrogalvanized and certified under UL 514B.

Bonding bushings installed on metal conduit must be insulated and either a galvanized or zinc-alloy type.

Conduit used for horizontal directional drilling must be high density polyethylene Type IPS, SDR 9 and comply with ASTM F2160

Conduit for fiber optic cable systems must be high density polyethylene schedule 40 high density polyethylene, complying with NEMA TC-7, except for horizontal directional drilling.

Sealing plug must:

1. Be reusable
2. Withstand a pressure of 5 psi
3. Provide an airtight seal
4. Seal conduit and innerducts simultaneously

Sealing plug for empty conduit must have a ~~rope tie~~ [#10 solid wire](#).

Innerduct must be:

1. HDPE tubing or fabric mesh pouch.
2. Nominal 1 inch inside diameter, with a minimum Standard Dimension Ratio (SDR) rating of 11
3. Continuous without splices or joints.
4. Ribbed inside and outside when used inside a conduit.
5. Ribbed inside and smooth on the outside for direct burial.
6. Unique color throughout the entire length of the conduit segment.
7. Shipped and stored on a reel, covered to protect colors from UV deterioration. The reel must be marked with:
 - 7.1. Manufacturer's name
 - 7.2. Contract number
 - 7.3. Size and length of the innerduct

High density polyethylene for innerduct must:

1. Comply with ASTM D3485, D3035, D2239, and D2447, and NEMA TC7 and TC2
2. Have a minimum tensile yield strength of 3300 psi under ASTM D638
3. Have a density of 59.6187 lb/ft³ ± 0.3121 lb/in³ under ASTM D1505

Tracer wire must be a minimum No. **10 42** solid copper conductor with orange insulation Type TW, THW, RHW, or USE. For direct burial, the tracer wire insulation must be Type UF.

86-1.02B(2) Structures Accessories

Steel hangers, steel brackets, and other fittings used to support conduit in or on a wall or bridge superstructure must comply with section 75-3.

Precast concrete cradles for conduit must be made of minor concrete and commercial-quality welded wire fabric. The minor concrete must contain a minimum of 590 lb of cementitious material per cubic yard. The cradles must be moist cured for a minimum of 3 days.

86-1.02C Pull Boxes

86-1.02C(1) General

A pull box cover must have a nonskid surface.

A metal pull box cover must include a fitting for a bonding conductor.

A pull box cover must have a marking on the top that is:

1. Clearly defined
2. Uniform in depth
3. Parallel to the longer side
4. From 1 to 3 inches in height

The cover marking must include ALAMEDA COUNTY and one of the following:

1. *SERVICE* for service circuits between a service point and service disconnect
2. *SERVICE IRRIGATION* for circuits from a service equipment enclosure to an irrigation controller
3. *SERVICE BOOSTER PUMP* for circuits from a service equipment enclosure to the booster pump
4. *TDC POWER* for circuits from a service equipment enclosure to telephone demarcation cabinet
5. ***STREET LIGHTING*** for a lighting system
6. *SIGN ILLUMINATION* for a sign illumination system
7. ***TRAFFIC SIGNAL AND LIGHTING*** for a signal and lighting system
8. *RAMP METER* for a ramp metering system
9. *TMS* for a traffic monitoring station
10. *FLASHING BEACON* for a flashing beacon system
11. *CMS* for a changeable message sign system
12. *INTERCONNECT* for an interconnect conduit and cable system
13. *FIBER OPTIC* for fiber optic cable system
- ~~14. ***ELECTRICAL SYSTEMS*** if more than one system is shared in the same pull box~~

~~The following circuits must not include CALTRANS in the cover marking:~~

- ~~1. Electrical service~~
- ~~2. Sprinkler control~~
- ~~3. Telephone service~~

The load rating must be:

1. Stenciled or stamped on the inside and outside of the pull box
2. Stamped on the outside of the cover

If a transformer or other device must be placed in the pull box, include recesses for a hanger.

The hardware must be stainless steel containing 18 percent chromium and 8 percent nickel.

86-1.02C(2) Nontraffic Pull Boxes

A nontraffic pull box and cover must comply with ANSI/SCTE 77, "Specification for Underground Enclosure Integrity," for Tier 22 load rating and must be gray ~~or brown~~.

The cover markings must be cast in the mold of the cover or be engraved on a metal or UV resistant ABS plate secured in the cover with stainless steel screws.

A pull box extension must be made of the same material as the pull box. The extension may be another pull box if the bottom edge of the pull box fits into the opening for the cover.

The bolts, nuts, and washers must be a captive design. Captive bolts for securing the cover of nontraffic pull boxes must be capable of withstanding a torque from 55 to 60 ft-lb and a minimum pull-out strength of 750 lb.

86-1.02C(3) Traffic Pull Boxes

Not Used

86-1.02C(4) Tamper Resistant Pull Boxes

Not Used

86-1.02D Tapes

86-1.02D(1) General

Reserved

86-1.02D(2) Pull Tape

Pull tape must be a flat, woven, lubricated, soft-fiber, polyester tape with a minimum tensile strength of 1,800 lb. The tape must have sequential measurement markings every 3 feet.

86-1.02D(3) Warning Tape

Warning tape must be orange color polyolefin film, minimum elongation of 500 percent before breakage, water and corrosion resistant, and comply with requirements shown in the following table:

Warning Tape Requirements

Quality characteristic	Requirement
Thickness (min, mil)	4
Width (in)	4
Tensile strength of material (min, psi)	2800
Message spacing intervals (ft)	3

The warning tape must have a printed message that reads: CAUTION: ALAMEDA COUNTY FACILITIES BELOW.

The printed text height and color must be 1 inch, black color text over bright orange background.

86-1.02E Piezoelectric Axle Sensors

Not Used

86-1.02F Conductors and Cables

86-1.02F(1) General

Conductors and cables must be clearly and permanently marked the entire length of their outer surface with:

1. Manufacturer's name or trademark
2. Insulation-type letter designation
3. Conductor size
4. Voltage
5. Number of conductors for a cable

The minimum insulation thickness must be 40 mils for #14 to #10 and 54 mils for #10 to #2, and color code requirements must comply with NEC.

86-1.02F(2) Conductors

86-1.02F(2)(a) General

A conductor must be UL listed or NRTL certified and rated for 600 V(ac).

Conductors must be identified as shown in the following table:

Conductor Identification

Circuit	Signal phase or function	Identification			Copper size
		Insulation color		Band symbols	
		Base	Stripe ^a		

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Signals (vehicle) ^{a,b}	2, 6	Red, yellow, brown	Black	2, 6	14
	4, 8	Red, yellow, brown	Orange	4, 8	14
	1, 5	Red, yellow, brown	None	1, 5	14
	3, 7	Red, yellow, brown	Purple	3, 7	14
	Ramp meter 1	Red, yellow, brown	None	No band required	14
	Ramp meter 2	Red, yellow, brown	Black	No band required	14
Pedestrian signals	2p, 6p	Red, brown	Black	2p, 6p	14
	4p, 8p	Red, brown	Orange	4p, 8p	14
	1p, 5p	Red, brown	None	1p, 5p	14
	3p, 7p	Red, brown	Purple	3p, 7p	14
Push button assembly or accessible pedestrian signal	2p, 6p	Blue	Black	P-2, P-6	14
	4p, 8p	Blue	Orange	P-4, P-8	14
	1p, 5p	Blue	None	P-1, P-5	14
	3p, 7p	Blue	Purple	P-3, P-7	14
Traffic signal controller cabinet	Ungrounded circuit conductor	Black	None	CON-1	6
	Grounded circuit conductor	White	None	CON-2	6
Highway lighting pull box to luminaire	Ungrounded - line 1	Black	None	No band required	<u>10 44</u>
	Ungrounded - line 2	Red	None	No band required	<u>10 44</u>
	Grounded	White	None	No band required	<u>10 44</u>
Multiple highway lighting	Ungrounded - line 1	Black	None	ML1	10
	Ungrounded - line 2	Red	None	ML2	10
	Ungrounded - line 3	White	None	ML3	10
Lighting control	Ungrounded - Photoelectric unit	Black	None	C1	14
	Switching leg from Photoelectric unit or SM transformer	Red	None	C2	14
Service	Ungrounded - line 1 (signals)	Black	None	No band required	6
	Ungrounded - line 2 (lighting)	Red	None	No band required	8
Sign lighting	Ungrounded - line 1	Black	None	SL-1	10
	Ungrounded - line 2	Red	None	SL-2	10
Flashing beacons	Ungrounded between flasher and beacons	Red or yellow	None	FB-Location. ^c	14
Grounded circuit conductor	Push button assembly or accessible pedestrian signal	White	Black	No band required	14
	Signals and multiple lighting	White	None	No band required	<u>8 40</u>
	Flashing beacons and sign lighting	White	None	No band required	12
	Lighting control	White	None	C-3	14

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	Service	White	None	No band required	~~6~~ 14
Railroad preemption		Black	None	R	14
Spares		Black	None	No band required	14

Notes:

^aOn overlaps, the insulation is striped for the 1st phase in the designation, e.g., phase (2+3) conductor is striped as for phase 2.

^bBand for overlap and special phases as required

^cFlashing beacons having separate service do not require banding.

The insulation color must be homogeneous throughout the full depth of the insulation. The identification stripe must be continuous throughout the length of the conductor.

86-1.02F(2)(b) Aluminum Conductors

Not Used

86-1.02F(2)(c) Copper Conductors

86-1.02F(2)(c)(i) General

Copper wire must comply with ASTM B3 and B8.

No. 8 and larger conductors must be stranded.

Insulation for no. 14 to no. 4 conductors must be one of the following:

1. Type TW PVC under ASTM D2219
2. Type THW PVC
3. Type USE, RHH, or RHW cross-linked polyethylene

The insulation for no. 2 and larger conductors must be one of the above ~~or THWN~~.

86-1.02F(2)(c)(ii) Bonding Jumpers and Equipment Grounding Conductors

A bonding jumper must be solid copper wire ~~or copper braid of the same cross-sectional area as a~~ no. 8 conductor or larger.

An equipment grounding conductor must be insulated.

86-1.02F(2)(c)(iii) Inductive Loop Conductors

An inductive loop conductor must comply with the requirements shown in the following table:

Conductor Requirements for Inductive Loop Detectors

Loop wire	Requirement
Type 1	Type RHW-USE neoprene-jacketed or Type USE cross-linked polyethylene, insulated, no. 12, stranded copper wire with a minimum 40-mils insulation thickness at any point.
~~Type 2~~	~~Type THWN or Type XHHW, no. 14, stranded copper wire in a plastic tubing. The plastic tubing must be polyethylene or vinyl rated for use at 105 degrees C and resistant to oil and gasoline. The outside diameter of the tubing must be at most 0.27 inch with a wall thickness of at least 0.028 inch.~~

86-1.02F(2)(d) Reserved

86-1.02F(3) Cables

86-1.02F(3)(a) General

Not Used

86-1.02F(3)(b) Aluminum Cables

Not Used

86-1.02F(3)(c) Reserved**86-1.02F(3)(d) Copper Cables****86-1.02F(3)(d)(i) General**

Not Used

86-1.02F(3)(d)(ii) Conductor Signal Cables

Not Used

86-1.02F(3)(d)(iii) Detector Lead-in Cables

Not Used

86-1.02F(3)(d)(iv) Reserved**86-1.02F(3)(d)(v) Signal Interconnect Cables**

Not Used

86-1.02F(3)(d)(vi) Communication Cables

Not Used

86-1.02G Equipment Identification Characters

Equipment identification characters must be 3 2-1/2 inch, series D lettering, except on wood poles, they must be 3-inch lettering.

The characters must be self-adhesive reflective labels or paint, except on wood poles, they must be ~~embossed on aluminum~~ attached to an aluminum strip and nailed or screwed to pole.

The self-adhesive reflective labels must:

1. Be from 3 to 5 mils thick
2. Have all black capital characters on a white background
3. Extend beyond the character by a minimum of 1/4 inch

86-1.02H Splicing Materials

Splicing materials include:

1. Connectors
2. Electrical insulating coating
3. PVC electrical tape
4. Butyl rubber stretchable tape
5. PVC pressure-sensitive adhesive tape
6. Heat shrink tubing

Connectors must be C-shaped compression or butt type.

Electrical insulating coating must be a fast drying sealant with low nontoxic fumes.

PVC electrical tape must have a minimum thickness of 6 mils.

Butyl rubber stretchable tape with liner must have a minimum thickness of 120 mils.

PVC pressure-sensitive adhesive electrical tape must have a minimum thickness of 6 mils.

Electrical tapes must be self-fusing, oil- and flame-resistant, synthetic rubber and be UL listed or NRTL certified.

Heat-shrink tubing must be made of irradiated polyolefin tubing with a minimum wall thickness of 40 mils before contraction and an adhesive mastic inner wall. When heated, the inner wall must melt and fill the

crevices and interstices of the covered splice area and the outer wall must shrink to form a waterproof insulation.

Heat-shrink tubing must comply with the requirements for extruded, insulating tubing at 600 V(ac) specified in UL Standard 468D and ANSI C119.1 and the requirements shown in the following table:

Heat-Shrink Tubing Requirements

Quality characteristic	Requirement
Shrinkage ratio of supplied diameter ^a (max, %)	33
Dielectric strength (min, kV/in)	350
Resistivity (min, Ω /in)	25×10^{13}
Tensile strength (min, psi)	2,000
Operating temperature (°C)	-40–90 (135 °C in emergency)
Water absorption (max, %)	0.5

^aWhen heated to 125 °C and allowed to cool to 25 °C

86-1.02I Connectors and Terminals

Copper connectors must comply with UL-486A.

Aluminum connector must comply with UL-486 B.

Connectors and terminals must be rated for the conductors' size and material type and be prefilled with oxide-inhibiting compound.

Connectors and terminals for copper conductors must be a compression or crimp type.

Connectors and terminals for aluminum conductors must be a compression type.

86-1.02J Standards, Poles, Pedestals, and Posts

Standards for signals, lighting, and flashing beacons, poles for closed circuit television, pedestals for cabinets, posts for extinguishable message sign and posts for pedestrian push button assemblies must comply with section 56-3.

86-1.02K Luminaires

86-1.02K(1) General

A luminaire must:

1. Be self-contained, not requiring assembly.
2. Comply with UL 1598 for luminaires in wet locations.
3. Have a power supply with ANSI/IEC rating of at least IP65.
4. Weigh less than 35 lb.
5. Have a minimum operating life of 100,000 hours when operated for an average time of 11.5 hours at an average temperature of 70 degrees F.
6. Operate over a temperature range from -40 to 130 degrees F.
7. Be operationally compatible with photoelectric controls.
8. Have a nominal correlated color temperature of **4000K** ~~range of 3000K~~ under ANSI C78.377 and a color rendering index of 70 or greater.
9. Have a maximum-effective projected area of 1.4 sq ft when viewed from either side or end.
10. Comply with California Test 611.
11. Have a power factor of 0.90 or greater. The total harmonic distortion, current, and voltage induced into a power line by a luminaire must not exceed 20 percent.
12. Comply with the maximum power consumption and isofootcandle curves as shown.
13. Be on the Authorized Material List for LED luminaires or must be submitted for testing and addition to the AML.

A luminaire must include a surge protection device to withstand high-repetition noise transients caused by utility line switching, nearby lightning strikes, and other interferences. The device must protect the luminaire from damage and failure due to transient voltages and currents as defined in Tables 1 and 4 of

ANSI/IEEE C64.41.2 for location category C-High. The surge protection device must comply with UL 1449 and ANSI/IEEE C62.45 based on ANSI/IEEE C62.41.2 definitions for standard and optional waveforms for location category C-High.

The luminaire must operate over the entire voltage range from 120 to 480 V(ac), 60 ± 3 Hz or one of the following:

1. From 95 to 277 V(ac) for luminaires rated 120 V(ac) or 240 V(ac)
2. From 347 to 480 V(ac) for luminaires rated 480 V(ac)

The fluctuations of line voltage must have no visible effect on the luminous output.

The L70 of the luminaire must be the minimum operating life or greater. Illuminance measurements must be calibrated to standard photopic calibrations.

The luminaire's housing must withstand a 1008 hour cyclic salt fog spray/UV test under ASTM D5894 and an evaluation under ASTM D714 with a blister size of 8 or greater and no more than medium density.

The luminaire's housing must be marine-grade alloy with less than 0.2 percent copper or die cast aluminum. All exposed aluminum must be anodized. A chromate conversion undercoating must be used underneath a thermoplastic polyester powder coat.

External bolts, screws, hinges, hinge pins, and door closure devices must be corrosion resistant.

The housing must be designed to prevent the buildup of water on its top surface. Exposed heat sink fins must be oriented to allow water to run off the luminaire and carry dust and other accumulated debris away from the unit. The optical assembly of the luminaire must be protected against dust and moisture intrusion to at least an UL 60529 rating of IP66. The power supply enclosure must be protected to at least an UL 60529 rating of IP43.

If the components are mounted on a down-opening door, the door must be hinged and secured to the luminaire's housing separately from other components. The door must be secured to the housing to prevent accidental opening. A safety cable must mechanically connect the door to the housing.

A luminaire must have a barrier-type terminal block secured to the housing to connect field wires. The terminal screws must be captive and equipped with wire grips for conductors up to no. 6.

The conductors and terminals must be identified and marked.

If needed, each refractor or lens must be made of UV-inhibiting high-impact plastic, such as acrylic or polycarbonate, or heat and impact-resistant glass. The refractor or lens must be resistant to scratching. Polymeric materials, except for the lenses of enclosures containing either the power supply or electronic components of the luminaire, must be made of UL94 V-0 flame-retardant materials.

The luminaire must be permanently marked inside the unit and outside of its packaging box. Marking consists of:

1. Manufacturer's name or trademark
2. Month and year of manufacture
3. Model, serial, and lot numbers
4. Rated voltage, wattage, and power in VA

An LED luminaire must:

1. Comply with Class A emission limits under 47 CFR 15(B) for the emission of electronic noise.
2. Have a power supply with:
 - 2.1. 2 leads to accept standard 0-10 V(dc).
 - 2.2. Dimming control compatible with IEC 60929, Annex E. If the control leads are open or the analog control signal is lost, the circuit must default to 100-percent power.
 - 2.3. Case temperature self rise of 77 degrees F or less above ambient temperature in free air with no additional heat sinks.

3. Have passive thermal management with enough capacity to ensure proper heat dissipation and functioning of the luminaire over its minimum operating life. The maximum junction temperature for the minimum operating life must not exceed 221 degrees F.
4. Have a junction-to-ambient thermal resistance of 95 degrees F per watt or less.
5. Contain circuitry that automatically reduces the power to the LEDs so the maximum junction temperature is not exceeded when the ambient temperature is 100 degrees F or greater.
6. Have a heat sink made of aluminum or other material of equal or lower thermal resistance. The use of fans or other mechanical devices is not allowed for cooling the luminaire.

The catastrophic loss or failure of 1 LED must not result in the loss of more than 20 percent of the total luminous output of the LED luminaire.

86-1.02K(2) Roadway luminaires

A roadway luminaire must:

1. Have a housing color that matches a color no. 26152 to 26440, 36231 to 36375, or 36440 of AMS-STD-595
2. Have an ANSI C136.41-compliant, locking-type, photocontrol receptacle with dimming connections and a watertight shorting cap
3. Not allow more than 2.5 percent of the rated lumens to project above 80 degrees measured up from the vertical plane in the direction of the roadway
4. Have equipment identification character labels outside the unit on the side that will face the road. Equipment identification characters consist of:
 - 4.1. R1 for Roadway 1, R2 for Roadway 2, R3 for Roadway 3, and R4 for Roadway 4
 - 4.2. Rated wattage

The luminaire's housing must have a slip fitter that must:

1. Fit on mast arms with outside diameters from 1-5/8 to 2-3/8 inches
2. Be adjustable to a minimum of ± 5 degrees from the axis of the tenon in a minimum of 5 steps: +5, +2.5, 0, -2.5, -5
3. Have clamping brackets that:
 - 3.1. Are made of corrosion-resistant materials or treated to prevent galvanic reactions
 - 3.2. Do not bottom out on the housing bosses when adjusted within the designed angular range
 - 3.3. Do not permanently set in excess of 1/32 inch when tightened

86-1.02K(3) Overhead Sign luminaires

Not Used

86-1.02L Reserved

86-1.02M Photoelectric Controls

Photoelectric control types are as shown in the following table:

Photoelectric Control Types

Control type	Description
I	Pole-mounted photoelectric unit. Test switch and a 15-A circuit breaker per ungrounded conductor, housed in an enclosure.
II	Pole-mounted photoelectric unit. Contactor, a 15-A circuit breaker per ungrounded conductor, and test switch located in a service equipment enclosure.
III	Pole-mounted photoelectric unit. Contactor, a 15-A circuit breaker per ungrounded conductor, and a test switch housed in an enclosure.
IV	A photoelectric unit that plugs into a NEMA twist-lock receptacle, integral with the luminaire.
V	A photoelectric unit, contactor, a 15-A circuit breaker per ungrounded conductor, and test switch located in a service equipment enclosure.

The pole-mounted adaptor for Type I, II, and III photoelectric controls must include a terminal block and cable supports or clamps to support the wires.

Photoelectric unit must:

1. Have a screen to prevent artificial light from causing cycling.
2. Have a rating of 60 Hz, 105-130 V(ac), 210-240 V(ac), or 105-240 V(ac).
3. Operate at a temperature range from -20 to 55 degrees C.
4. Consume less than 10 W.
5. Be a 3-prong, twist-lock type with a NEMA IP 65 rating, ANSI C136.10-compliant.
6. Have a fail-on state.
7. Fit into a NEMA-type receptacle.
8. Turn on from 1 to 5 footcandles and turn off from 1.5 to 5 times the turn-on level. Measurements must be made by procedures in *EEI-NEMA Standards for Physical and Electrical Interchangeability of Light-Sensitive Control Devices Used in the Control of Roadway Lighting*.

Type I, II, III, and V photoelectric controls must have a test switch to allow manual operation of the lighting circuit. Switch must be:

1. Single-hole mounting, toggle type
2. 15 A, single pole and single throw
3. Labeled *Auto-Test* on a nameplate

Photoelectric control's contactor must be:

1. Normally open
2. Mechanical-armature type with contacts of fine silver, silver alloy, or equal or better material
3. Installed to provide a minimum space of 2-1/2 inches between the contactor terminals and the enclosure's sides

The terminal blocks must be rated at 25 A, 600 V(ac), molded from phenolic or nylon material, and be the barrier type with plated-brass screw terminals and integral marking strips.

86-1.02N Fused Splice Connectors

The fused splice connector for 240 and 480 V(ac) circuits must simultaneously disconnect both ungrounded conductors. The connector must not have exposed metal parts except for the head of the stainless steel assembly screw. The head of the assembly screw must be recessed a minimum of 1/32 inch below the top of the plastic boss that surrounds the head.

The connector must protect the fuse from water or weather damage. Contact between the fuse and fuse holder must be spring loaded.

Fuses must:

1. FNM-10 time delay supplementary fuse
2. 10-amp unless otherwise shown
1. ~~Be standard, midget, ferrule type~~
2. ~~Have a nontime delay feature~~
3. ~~Be 13/32 by 1 1/2 inches~~

Fuse ratings for luminaires are shown in the following table:

Fuse Current Rating Requirements		
Circuit voltage	Fuse voltage rating	Soffit and roadway luminaires
120 V(ac)	250 V(ac)	<u>10 5-A</u>
240 V(ac)	250 V(ac)	<u>10 5-A</u>
480 V(ac)	500-600 V(ac)	5 A

Fuse ratings for transformers are shown in the following table:

Fuse Current Rating Requirements

Circuit voltage	Fuse voltage rating	Fuse current rating for Single phase (two wires) Transformers (primary side)		
		1 kVA	2 kVA	3 kVA
120 V(ac)	250 V(ac)	10 A	20 A	30 A
240 V(ac)	250 V(ac)	6 A	10 A	20 A
480 V(ac)	500-600 V(ac)	3 A	6 A	10 A

86-1.02O Grounding Electrodes

Grounding electrode must be:

1. 1 piece
2. Minimum 10-foot length of one of the following:
 - ~~2.1. Galvanized steel rod or pipe not less than 3/4 inch in diameter~~
 - 2.12. Copper clad steel rod not less than 5/8 inch in diameter

86-1.02P Enclosures

Not Used

86-1.02Q Cabinets

Not Used

86-1.02R Signal Heads

Not Used

86-1.02S Pedestrian Signal Heads

Not Used

86-1.02U Push Button Assemblies

Not Used

86-1.02V Video Detection Cameras

Not Used

86-1.02W Loop Detector Sealants

Not Used

86-1.02W(2) Asphaltic Emulsion Sealant

Not Used

86-1.02W(3) Elastomeric Sealant

Not Used

86-1.02W(4) Hot-Melt Rubberized Asphalt Sealant

Not Used

86-1.02X Electronic Markers and Locators

Not Used

86-1.02Y Transformers

Not Used

86-1.02Z Batteries

Not Used

SECTION 86

GENERAL

86-1.03 CONSTRUCTION

Not Used

86-1.04 PAYMENT

Not Used

Replace section 87 with:

87 ELECTRICAL SYSTEMS

87-1 GENERAL

87-1.01 GENERAL

87-1.01A Summary

Section 87 includes general specifications for constructing and installing electrical systems.

The Agency deducts the cost for maintenance performed by the Agency on new or portions of existing systems modified under the Contract.

87-1.01B Definitions

Reserved

87-1.01C Submittals

Submit a digital file for geographic information system mapping for:

1. Conduit
2. Pull boxes
3. Cabinets
4. Service equipment enclosures
5. Standards

The digital file must consist of:

1. Longitudinal and latitude coordinates, under the WGS84 reference coordinate system. The coordinates must be in decimal format having 6 significant figures after the decimal point. Coordinates must be read at the center of pull boxes, cabinet, standards, and service equipment enclosures; and on top of conduit at 20-foot intervals before backfill.
2. Type, depth and size for conduits.
3. Type for pull boxes, standards, cabinets, and service equipment enclosures.

87-1.01D Quality Assurance

87-1.01D(1) General

Reserved

87-1.01D(2) Quality Control

87-1.01D(2)(a) General

Before shipping the material to the job site, submit ~~to~~ **METS** test samples of:

1. Accessible pedestrian signals
2. LED countdown pedestrian signal face modules
3. LED signal modules
4. Luminaires

Submit a sample size as shown in the following table:

Electrical Material Sampling

Contract quantity	Test sample size
1–8	1
9–15	2
16–25	3
26–90	5
91–150	8
151–280	13
281–500	20
501–1200	32

Before starting operation of an electrical system, perform a conductor test in the presence of the Engineer.

Conductor test consists of testing each conductor and the conductors in cables for:

1. Continuity.
2. Grounds.
3. Insulation resistance at 500 V(dc) between the circuit and ground. A minimum insulation resistance of 100 MΩ on circuits must be attained.

Start the operational test of the system on any day except Friday or the day before a holiday. The operational test for signals must start from 9:00 a.m. to 2:00 p.m. Notify the Engineer 48 hours before starting the test.

An operational test consists of a minimum of 5 business days of continuous, satisfactory operation of the system. If the system fails, correct the problem and retest the system. A shutdown of the system caused by traffic, a power interruption, or unsatisfactory performance of Agency-furnished materials does not constitute discontinuity of the test.

87-1.01D(2)(b) Electronic Markers

Electronic marker test consists of placing the electronic marker in the pull box, temporarily marking the pull box location with a utility flag, and using a compatible electronic marker locator to perform the following location test in the presence of the Engineer:

1. Within a 10 foot radius of the electronic marker, slowly move the locator toward the marker to determine the exact location of the pull box.
2. Repeat the test at four different points at 90 degree from each other on a horizontal plane, away from the marker location, as shown. Take the average of the four points to determine the detected location of the pull box.
3. Detected location of the pull box must be within 0.5 feet of the actual location.

87-1.01D(2)(c) Battery Backup System

Not Used

87-1.01D(2)(d) Piezoelectric Axle Sensors

Not Used

87-1.02 MATERIALS

Not Used

87-1.03 CONSTRUCTION**87-1.03A General**

The Engineer determines the final locations of electrical systems.

Verify the locations of electrical systems and the depths of existing detectors, conduits, and pull boxes.

Notify the Engineer before performing work on the existing system.

You may shut down the system for alteration or removal.

Where an existing Agency underground facility is shown within 10 feet of any excavation, locate and field mark the facility before performing work that could damage or interfere with the existing facility.

If an existing facility is within 2 feet of an excavation, determine the exact location of the facility by excavating with hand tools before using any power-operated or power-driven excavating or boring equipment. A vacuum excavator may be used if authorized.

Notify the Engineer immediately if an existing facility is damaged by your activities:

1. Damaged existing traffic signal systems must be repaired or replaced within 24 hours. If the system cannot be fixed within 24 hours or it is located on a structure, provide a temporary system until the system can be fixed.
2. Damaged existing lighting systems must be repaired or replaced by nightfall. If the system cannot be fixed by nightfall, provide a temporary system until the system can be fixed.

If existing underground conduit is to be incorporated into a new system, clean it with a mandrel or cylindrical wire brush and blow it clean with compressed air.

Limit the shutdown of traffic signal systems to normal working hours. Notify the local traffic enforcement agency before shutting down the signal.

Place temporary W3-1 and R1-1 signs in each direction to direct traffic through the intersection during shutdown of the signal. Place two R1-1 signs for 2-lane approaches. The signs must comply with part 2 of the *California MUTCD*.

Cover signal faces when the system is shut down overnight. Cover temporary W3-1 and R1-1 signs when the system is turned on.

If you work on an existing lighting system and the roadway is to remain open to traffic, ensure the system is in operation by nightfall.

Replace detectors you damage within 72 hours, or the Agency replaces them and deducts the cost.

Work performed on an existing system not described is change order work.

Do not use electrical power from existing highway facilities unless authorized.

Maintain a minimum 48-inch clearance for a pedestrian pathway when placing equipment.

Except for service installation or work on service equipment enclosures, do not work above ground until all materials are on hand to complete the electrical work at each location.

Bond all metal components to form a continuous grounded system as specified in NEC.

Ground metallic equipment mounted less than 8 feet above the ground surface on a wood pole.

If you damage any portion of a concrete curb, sidewalk, curb ramp, driveway, or gutter depression, replace the entire section between contraction or expansion joints under section 73.

Apply equipment identification characters.

Orient louvers, visors, and signal faces such that they are clearly visible to approaching traffic from the direction being controlled.

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Test loops and the detector lead-in cable circuit for continuity, ground, and insulation resistance at the controller cabinet before connecting detector lead-in cable to the terminal block.

Perform an operational test of the systems.

Before starting the operational test for systems that impact traffic, the system must be ready for operation, and all signs, pavement delineation, and pavement markings must be in place at that location.

Collect the geographic information system mapping data.

87-1.03B Conduit Installation

87-1.03B(1) General

The installation of conduit includes installing caps, bushings, and pull tape and terminating the conduit in pull boxes, foundations, poles, or a structure.

Notify the Engineer at least 4 business days before starting horizontal directional drilling method or jack and drill activities.

Limit the number of bends in a conduit run to no more than 360 degrees between pull points.

Use conduit to enclose conductors except where they are installed overhead or inside standards or posts.

You may use a larger size conduit than specified for the entire length between termination points. Do not use a reducing coupling.

Extend an existing conduit using the same material. Terminate conduits of different materials in a pull box.

Install 2 conduits between a controller cabinet and the adjacent pull box.

Use a minimum trade size of conduit of:

1. ~~4-1/2~~ 2 inches from an electrolier to the adjacent pull box
2. 1 inch from a pedestrian push button post to the adjacent pull box
3. 2 inches from a signal standard to the adjacent pull box
4. 3 inches from a controller cabinet to the adjacent pull box
5. 2 inches from an overhead sign to the adjacent pull box
6. 2 inches from a service equipment enclosure to the adjacent pull box
7. ~~4-1/2~~ 2 inches if unspecified

Use Type 1 conduit:

1. On all exposed surfaces
2. In concrete structures
3. Between a structure and the nearest pull box

Ream the ends of shop-cut and field-cut conduit to remove burrs and rough edges. Make the cuts square and true. Do not use slip joints and running threads to couple conduit. If a standard coupling cannot be used for metal-type conduit, use a threaded union coupling. Tighten the couplings for metal conduit to maintain a good electrical connection.

Cap the ends of conduit to prevent debris from entering before installing the conductors or cables. Use a plastic cap for Type 1, 2, and 5 conduits and a standard pipe cap for all other types of conduit or bell.

For Type 1, 2, and 5 conduits, use threaded bushings and bond them using a jumper. For other types of conduit, use nonmetallic bushings or end bell.

Do not install new conduit through foundations.

Cut Type 2 conduit with pipe cutters; do not use hacksaws. Use standard conduit-threading dies for threading conduit. Tighten conduit into couplings or fittings using strap wrenches or approved groove joint pliers.

Cut Type 3 conduit with tools that do not deform the conduit. Use a solvent weld for connections.

Protect shop-cut threads from corrosion under the standards shown in the following table:

Shop-Cut Thread Corrosion Protection

Conduit	Standard
Types 1 and 2	ANSI C80.1
Type 5	ANSI C80.6

Apply 2 coats of unthinned, organic zinc-rich primer to metal conduit before painting. Use a primer on the Authorized Material List for organic zinc-rich primers. Do not use aerosol cans. Do not remove shop-installed conduit couplings.

For conduits, paint:

1. All exposed threads
2. Field-cut threads, before installing conduit couplings to metal conduit
3. Damaged surfaces on metal conduit

If a Type 2 conduit or conduit coupling coating is damaged:

1. Clean the conduit or fitting and paint it with 1 coat of rubber-resin-based adhesive under the manufacturer's instructions
2. Wrap the damaged coating with at least 1 layer of 2-inch-wide, 20 mils-minimum-thickness, PVC tape under ASTM D1000 with a minimum tape overlap of 1/2 inch

You may repair damaged spots of 1/4 inch or less in diameter in the thermoplastic coating by painting with a brushing-type compound supplied by the conduit manufacturer.

If factory bends are not used, bend the conduit to a radius no less than 6 times its inside diameter without crimping or flattening it. Comply with the bending requirements shown in the following table:

Conduit-Bending Requirements

Type	Requirement
1	Use equipment and methods under the conduit manufacturer's instructions.
2	Use a standard bending tool designed for use on thermoplastic-coated conduit. The conduit must be free of burrs and pits.
3	Use equipment and methods under the conduit manufacturer's instructions. Do not expose the conduit to a direct flame.
5	Use equipment and methods under the conduit manufacturer's instructions.

Install ~~pull tape~~ **#10 insulated copper solid wire** with at least 2 feet of slack in each end of the conduit that will remain empty. Attach the ~~wire's tape's~~ ends to the conduit.

Install conduit terminating in a standard or pedestal from 2 to 3 inches above the foundation. Slope the conduit toward the handhole opening.

Terminate conduit installed through the bottom of a nonmetallic pull box 2 inches above the bottom and 2 inches from the wall closest to the direction of the run.

87-1.03B(2) Conduit Installation for Structures

Not Used

87-1.03B(3) Conduit Installation Underground

87-1.03B(3)(a) General

Install conduit to a depth of:

1. ~~44~~ **45** inches for the trench-in-pavement method
2. ~~48~~ **36** inches, minimum, under sidewalk and curbed paved median areas

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3. 42 inches, minimum, below the bottom of the rail of railroad tracks
4. 30 inches, minimum, everywhere else below grade

Place conduit couplings at a minimum of 6 inches from the face of a foundation.

Place a minimum of 2 inches of sand bedding in a trench before installing the conduit and 18 inches of slurry cement over the conduit before placing additional backfill material.

The slurry must be pigmented to match color no. 21105 of AMS-STD-595.

If installing conduit within the limits of hazardous locations as specified in NEC for Class I, division 1, install and seal Type 1 or Type 2 conduit with explosion-proof sealing fittings.

87-1.03B(3)(b) Conduit Installation under Paved Surfaces

~~You may lay conduit on existing pavement within a new curbed median constructed on top.~~

Install conduit under existing pavement by trenching-in-pavement method, unless the horizontal direction drill method or jack and drill method is authorized. ~~either the horizontal directional drill method or jack and drill method. You may use the trench in pavement method for either of the following conditions:~~

- ~~1. If conduit is to be installed behind the curb under the sidewalk~~
- ~~2. If the delay to vehicles will be less than 5 minutes~~

~~Do not use the trench in pavement method for conduit installations under freeway lanes or freeway-to-freeway connector ramps.~~

87-1.03B(3)(c) High Density Polyethylene Conduit Installation

For sweeps, maintain a conduit bend radius of a minimum 10 times the outside diameter of the conduit.

Conduits must not protrude more than 2 inches inside the pull box and vaults, and must enter at an angle less than 20 degrees from either the vertical or horizontal axis.

Demonstrate a minimum of 2 test fusions to the Engineer prior to performing fusion operations on HDPE conduit to be installed.

Join HDPE conduit using the electro fusion method recommended by the conduit manufacturer. Do not expose conduit to direct flame. The electro-fusion must be performed by a person certified by the conduit manufacturer.

Place warning tape in the trench 6 inches below finished grade.

Backfill trench with slurry concrete under section 19-3.02E. The size of the aggregate must be no larger than 3/8 inch. Provide adequate spacers, tie-downs and bracing to maintain conduits in place during backfill.

For trenches in paved areas, only the top 4 inch of concrete backfill must be pigmented.

Blow out all conduits with compressed air until all foreign material is removed, before installing innerducts.

Install innerducts as one continuous unit between vaults. Innerducts may be interrupted inside pull boxes located between vaults and cabinets.

Lubricate innerducts per manufacturer's instructions during installation.

Install a pull-tape trace wire in conduits and innerducts to remain empty.

Seal the ends of conduit after cables or pull-tape trace wire are installed.

87-1.03B(3)(d) Conduit Installation under Railroad Tracks

Not Used

87-1.03B(4) Conduit Installation by Horizontal Directional Drilling Method

Install a conduit to a minimum depth of **4 3** feet and maximum depth of 6 feet. If you must install a conduit less than **4 3** feet in depth or greater than 6 feet in depth, the installation must be authorized.

The diameter of the bore hole must be no larger than 1.5 times the outside diameter of the conduit.

Water-based mineral slurry or wetting solution may be used to lubricate the boring tool and stabilize the soil surrounding the boring path.

Disposal of residue must comply with section 13-4.03D.

The horizontal directional drilling equipment must have directional control of the boring tool and have an electronic boring tool location detection system. During operation, the equipment must be able to determine the location of the tool both horizontally and vertically.

Do not use slurry cement backfill.

Use a mandrel to prove the conduit is free and clear of dirt, rocks, and other debris after installation.

87-1.03B(5) Conduit Installation by the Jack and Drill Method

Keep the jacking or drilling pit 2 feet away from the pavement's edge. Do not weaken the pavement or soften the subgrade with excessive use of water.

If an obstruction is encountered, obtain authorization to cut small holes in the pavement to locate or remove the obstruction.

You may install Type 2 or Type 3 conduit under the pavement if a hole larger than the conduit's diameter is predrilled. The predrilled hole must be less than one and half the conduit's diameter.

Remove the conduit used for drilling or jacking and install new conduit for the completed work.

87-1.03B(6) Conduit Installation by the Trenching-In-Pavement Method

Install conduit by the trenching-in-pavement method using a trench approximately 2 inches wider than the conduit's outside diameter but not exceeding 6 inches in width.

Where additional pavement is to be placed, you must complete the trenching before the final pavement layer is applied.

If the conduit shown is to be installed under the sidewalk, you may install it in the street within 3 feet of and parallel to the face of the curb. Install pull boxes behind the curb.

Cut the trench using a rock-cutting excavator. Minimize the shatter outside the removal area of the trench.

Dig the trench by hand to the required depth at pull boxes.

Place conduit in the trench.

Backfill the trench with minor concrete to the pavement's surface by the end of each work day. If the trench is in asphalt concrete pavement and no additional pavement is to be placed, backfill the top 0.10 foot of the trench with minor HMA within 3 days after trenching.

87-1.03C Installation of Pull Boxes**87-1.03C(1) General**

Install pull boxes within State, County, or city right of way. Place pull boxes either 2-inches from the back of curb or 2-inches from the rear of walkways. Do not place in the center of walkways, nor within or in front of any existing or proposed driveway or curb ramp unless directed. Pull boxes that are directed to be placed in a driveway must conform to Caltrans Standard Drawing ES-8.

Pull boxes placed outside of an existing concrete area, in dirt, or within a planter strip or island, must be set with a concrete cap that extends 6-inches on all outside surfaces areas with a minimum thickness of 4-inches.

Signal interconnect pull boxes must be #6E (extended depth).

Install pull boxes no more than ~~200~~ 100 feet apart, except for signal interconnect pull boxes which can be spaced as much as 200-ft apart.

You may install larger pull boxes than specified or shown and additional pull boxes to facilitate the work except in structures.

Install a pull box on a bed of crushed rock and grout it before installing conductors. The grout must be from 0.5 to 1 inch thick and sloped toward the drain hole. Place a layer of roofing paper between the grout and the crushed rock sump. Make a 1-inch drain hole through the grout at the center of the pull box. Where shown, authorized, or directed, install a pull box on a bed of 1½ inch clean flat, smooth river run rock in lieu of crushed rock and grout.

Set the pull box such that the top is 1-1/4 inches above the surrounding grade in unpaved areas and leveled with the finished grade in sidewalks and other paved areas.

Place the cover on the box when not working in it.

Grout around conduits that are installed through the sides of the pull box.

Bond and ground the metallic conduit before installing conductors and cables in the conduit.

Bond metallic conduits in a nonmetallic pull box using bonding bushings and bonding jumpers.

~~Do not install pull boxes in concrete pads, curb ramps, or driveways.~~

Reconstruct the sump of a pull box if disturbed by your activities. If the sump was grouted, remove and replace the grout.

87-1.03C(2) Nontraffic Pull Boxes

For buried pull boxes, install the electronic marker.

~~If you bury a nontraffic pull box, set the box such that the top is 6 to 8 inches below the surrounding grade. Place a 20-mil thick plastic sheet made of HDPE or PVC virgin compounds to prevent water from entering the box.~~

Place mortar between a nontraffic pull box and a pull box extension.

Where a nontraffic pull box is in the vicinity of curb in an unpaved area, place the box adjacent to the back of the curb if practical.

Where a nontraffic pull box is adjacent to a post or standard, place the box within 5 feet downstream from traffic if practical.

If you replace the cover on a nontraffic pull box, anchor it to the box.

Perform the electronic marker test.

87-1.03C(3) Traffic Pull Boxes

Not Used

87-1.03C(4) Structure Pull Boxes

Not Used

87-1.03C(5) Tamper-Resistant Pull Boxes

Not Used

87-1.03D Battery Backup System Cabinets

Not Used

87-1.03E Excavating and Backfilling for Electrical Systems**87-1.03E(1) General**

Notify the Engineer at least 72 hours before starting excavation activities.

Dispose of surplus excavated material.

Restrict closures for excavation on a street or highway to 1 lane at a time unless otherwise specified.

87-1.03E(2) Trenching

Dig a trench for the electrical conduits or direct burial cables. Do not excavate until the installation of the conduit or direct burial cables.

Place excavated material in a location that will not interfere with traffic or surface drainage.

After placing the conduit or direct burial cable, backfill the trench.

Compact the backfill to a minimum relative compaction of:

1. 95 percent when placed within the hinge points and in areas where pavement is to be constructed
2. 90 percent when placed outside the hinge points and not under pavement

Restore the sidewalks, pavement, and landscaping at a location before starting excavation at another location.

87-1.03E(3) Concrete Pads, Foundations, and Pedestals

Construct foundations for standards, poles, metal pedestals, and posts under section 56-3.

Construct concrete pads, foundations, and pedestals for controller cabinets, telephone demarcation cabinets, and service equipment enclosures on firm ground.

Install anchor bolts using a template to provide proper spacing and alignment. Moisten the forms and ground before placing the concrete. Keep the forms in place until the concrete sets for at least 24 hours to prevent damage to the surface.

Use minor concrete for pads, foundations, and pedestals.

Construct a pad in front of a Type III service equipment enclosure. The pad must be 24 inches in length, 4 inches in thickness, and must match the width of the foundation.

In unpaved areas, place the top of the foundation 6 inches above the surrounding grade, ~~except place the top:~~ 4 inches above in paved and sidewalk areas.

- ~~1. 1 foot 6 inches above the grade for 336L cabinets~~
- ~~2. 1 foot 8 inches above the grade for Type C telephone demarcation cabinets~~
- ~~3. 2 inches above the grade for Type III service equipment enclosures~~

The pad must be 2 inches above the surrounding grade in unpaved areas.

In and adjacent to the sidewalk and other paved areas, place the top of the foundation 4 inches above the surrounding grade, ~~except place the top:~~

- ~~1. 1 foot 6 inches above the grade for 336L cabinets~~
- ~~2. 1 foot 8 inches above the grade for Type C telephone demarcation cabinets~~
- ~~3. Level with the finished grade for Type C and Type A cabinets and Type III service equipment enclosures~~

The pad must be level with the finished grade in paved areas.

Apply an ordinary surface finish under section 51-1.03F.

Allow the foundation to cure for at least 7 days before installing any equipment.

87-1.03F Conductors and Cable Installations**87-1.03F(1) General**

The installation of conductors and cables includes splicing conductors and attaching the terminals and connectors to the conductors.

Clean the conduit and pull all conductors and cables as a unit.

If new conductors or cables are to be added in an existing conduit:

1. Remove the content
2. Clean the conduit
3. Pull both old and new conductors and cables as a unit

Wrap conductors and secure cables to the end of the conduit in a pull box.

Seal the ends of conduits with a sealing compound after installing conductors or cables.

Neatly arrange conductors and cables inside pull boxes and cabinets. Tie the conductors and cables together with self-clinching nylon cable ties or enclose them in a plastic tubing or raceway.

Identify conductors and cables by direct labeling, tags, or bands fastened in such a way that they will not move. Use engraved or embossed mechanical methods for labeling (ink markers are not acceptable).

Provide band symbol identification on each conductor or each group of conductors comprising a signal phase in each pull box and near the end of terminated conductors.

Tape the ends of unused conductors and cables in pull boxes to form a watertight seal.

Do not connect the push-button or accessible pedestrian signal neutral conductor to the signal neutral conductor.

Install a tracer wire.

87-1.03F(2) Cables**87-1.03F(2)(a) General**

Reserved

87-1.03F(2)(b) Communication Cables**87-1.03F(2)(b)(i) General**

Terminate the ends of the communication cables as shown.

87-1.03F(2)(b)(ii) Category 5E and 6 Cables

Do not splice category 5E and 6 cables between components.

Provide a minimum of 3 feet of slack at each pull box and vault and minimum of 6 feet of slack at the cabinet.

87-1.03F(2)(b)(iii) Telephone Cables

Do not splice telephone cables between the telephone demarcation point and the controller cabinet.

Provide a minimum of 6 feet of slack at each cabinet, including the telephone demarcation cabinet.

87-1.03F(2)(c) Copper Cables**87-1.03F(2)(c)(i) General**

Reserved

87-1.03F(2)(c)(ii) Detector Lead-in Cables

Install a Type B ~~or C~~ detector lead-in cable in conduit.

Waterproof the ends of the lead-in cable before installing it in the conduit to prevent moisture from entering the cable.

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Splice loop conductors for each direction of travel for the same phase, terminating in the same pull box, to a separate lead-in cable running from the pull box adjacent to the loop detector to a sensor unit mounted in the controller cabinet. Install the lead-in cable without splices except at the pull box when connecting to loop wire.

Verify in the presence of the Engineer that the loops are operational before making the final splices between loop conductors and the lead-in cable.

Identify and tag each lead-in cable with the detector designation at the cabinet and pull box adjacent to the loops.

87-1.03F(2)(c)(iii) Conductors Signal Cables

Do not splice signal cables except for a 28-conductor cable.

Provide identification at the ends of terminated conductors in a cable as shown.

Provide identification for each cable in each pull box showing the signal standard to which it is connected except for the 28-conductor cable.

Connect conductors in a 12-conductor cable as shown in the following table:

12CSC Color Code and Functional Connection

Color code	Termination	Phase
Red	Red signal	2, 4, 6, or 8
Yellow	Yellow signal	2, 4, 6, or 8
Brown	Green signal	2, 4, 6, or 8
Red/black stripe	Red signal	1, 3, 5, or 7
Yellow/black stripe	Yellow signal	1, 3, 5, or 7
Brown/black stripe	Green signal	1, 3, 5, or 7
Black/red stripe	Spare or as required for red or <i>DONT WALK</i>	--
Black/white stripe	Spare or as required for yellow	--
Black	Spare or as required for green or <i>WALK</i>	--
Red/white stripe	Pedestrian signal <i>DONT WALK</i>	--
Brown/white stripe	Pedestrian signal <i>WALK</i>	--
White	Terminal block	Neutral

Provide identification for each 28-conductor cable C1 or C2 in each pull box. The cable labeled C1 must be used for signal phases 1, 2, 3, and 4. The cable labeled C2 must be used for signal phases 5, 6, 7, and 8.

Connect conductors in a 28-conductor cable as shown in the following table:

28CSC Color Code and Functional Connection

Color code	Termination	Phase
Red/black stripe	Red signal	2 or 6
Yellow/black stripe	Yellow signal	2 or 6
Brown/black stripe	Green signal	2 or 6
Red/orange stripe	Red signal	4 or 8
Yellow/orange stripe	Yellow signal	4 or 8
Brown/orange stripe	Green signal	4 or 8
Red/silver stripe	Red signal	1 or 5
Yellow/silver stripe	Yellow signal	1 or 5
Brown/silver stripe	Green signal	1 or 5
Red/purple stripe	Red signal	3 or 7
Yellow/purple stripe	Yellow signal	3 or 7
Brown/purple stripe	Green signal	3 or 7
Red/2 black stripes	Pedestrian signal <i>DONT WALK</i>	2 or 6
Brown/2 black stripes	Pedestrian signal <i>WALK</i>	2 or 6
Red/2 orange stripes	Pedestrian signal <i>DONT WALK</i>	4 or 8
Brown/2 orange stripes	Pedestrian signal <i>WALK</i>	4 or 8
Red/2 silver stripes	Overlap A, C	OLA ^a , OLC ^a
Brown/2 silver stripes	Overlap A, C	OLA ^c , OLC ^c
Red/2 purple stripes	Overlap B, D	OLB ^a , OLD ^a
Brown/2 purple stripes	Overlap B, D	OLB ^c , OLD ^c
Blue/black stripe	Pedestrian push button	2 or 6
Blue/orange stripe	Pedestrian push button	4 or 8
Blue/silver stripe	Overlap A, C	OLA ^b , OLC ^b
Blue/purple stripe	Overlap B, D	OLB ^b , OLD ^b
White/black stripe	Pedestrian push button common	--
Black/red stripe	Railroad preemption	--
Black	Spare	--
White	Terminal block	Neutral

OL = Overlap; A, B, C, and D = Overlapping phase designation

^aFor red phase designation

^bFor yellow phase designation

^cFor green phase designation

Use the neutral conductor only with the phases associated with that cable. Do not intermix neutral conductors from different cables except at the signal controller.

87-1.03F(2)(c)(iv) Signal Interconnect Cable

For a signal interconnect cable, provide a minimum of 6 feet of slack inside each controller cabinet.

Do not splice the cable unless authorized.

If splices are authorized, insulate the conductor splices with heat-shrink tubing and overlap the insulation at least 0.6 inch. Cover the splice area of the cable with heat-shrink tubing and overlap the cable jacket at least 1-1/2 inches. Provide a minimum of 3 feet of slack at each splice.

87-1.03F(3) Conductors

87-1.03F(3)(a) General

Do not run conductors to a terminal block on a standard unless they are to be connected to a signal head mounted on that standard.

Provide 3 spare conductors in all conduits containing ramp metering and traffic signal conductors.

Install a separate conductor for each terminal of a push button assembly and accessible pedestrian signal.

Provide conductor slack to comply with the requirements shown in the following table:

Conductor Slack Requirements	
Location	Slack (feet)
Signal standard	1
Lighting standard	1
Signal and lighting standard	1
Pull box	3
Splice	3
Standards with slip base	0

87-1.03F(3)(b) Reserved

87-1.03F(3)(c) Copper Conductors

87-1.03F(3)(c)(i) General

Install a minimum no. 8 grounding copper conductor in conduit and connect it to all-metal components.

Where conductors from different service points occupy the same conduit or standard, enclose the conductors from one of the services in flexible or rigid metal conduit.

87-1.03F(3)(c)(ii) Inductive Loop Conductors

Install a Type 1 ~~or 2~~ inductive loop conductor ~~except use Type 2 for Type E and F loop detectors.~~

Install the conductor without splices except at the pull box.

87-1.03F(4) Manual Installation Method

Use an inert lubricant for placing conductors and cables in conduit.

Pull the conductors and cables into the conduit by hand using pull tape.

87-1.03F(5) Direct Burial Aluminum Cable Installation Method

Install direct burial aluminum cable at a minimum 30 inches below grade in unpaved areas or at a minimum 18 inches below finished grade in paved areas.

Do not splice the direct burial aluminum cable between pull boxes and enclosures.

Fill trench with slurry cement backfill to between 4 to 6 inches below finished grade under section 19-3.02E.

Fill the remaining trench to finished grade with native material. In paved area, fill the remaining trench to finished grade with the same material of the paved area.

87-1.03G Equipment Identification Characters

The Engineer provides you with a list of the equipment identification characters.

Stencil the characters or apply the reflective self-adhesive labels to a clean surface.

Treat the edges of self-adhesive characters with an edge sealant.

Place the characters on the side facing traffic on:

1. Front doors of cabinets and service equipment enclosures.
2. Wood poles, fastened with 1-1/4-inch aluminum nails, for pole mounted enclosures
3. Adjacent bent or abutment at approximately the same station as an illuminated sign or soffit luminaire
4. Underside of the structure adjacent to the illuminated sign or soffit luminaire if no bent or abutment exists nearby
5. Posts of overhead signs
6. Standards

Before placing new characters on existing or relocated equipment, remove the existing characters.

87-1.03H Conductor and Cables Splices**87-1.03H(1) General**

You may splice:

1. Grounded conductors in a pull box
2. Accessible pedestrian signal and push bottom conductors in a pull box
3. Ungrounded signal conductors in a pull box if signals are modified
4. Ungrounded signal conductors to a terminal compartment or a signal head on a standard with conductors of the same phase in the pull box adjacent to the standard
5. Ungrounded lighting circuit conductors in a pull box if lighting circuits are modified

Solder all copper conductor splices using the hot iron, pouring, or dipping method. Do not perform open-flame soldering.

Do not solder aluminum conductors.

87-1.03H(2) Splice Insulation Methods

Insulate splices in a multiconductor cable to form a watertight joint and to prevent moisture absorption by the cable.

Use heat-shrink tubing or Method B to insulate a splice.

Use heat-shrink tubing as follows:

1. Cover the splice area completely with an electrical insulating coating and allow it to dry.
2. Place mastic around each conductor before placing them inside the tubing. Use the type of mastic specified in the tubing manufacturer's instructions.
3. Heat the area under the manufacturer's instructions. Do not perform open-flame heating. After contraction, each end of the heat-shrink tubing or the open end of the tubing's end cap must overlap the conductor insulation at least 1-1/2 inches.
4. Cover the entire splice with an electrical insulating coating and allow it to dry.

Use Method B as follows:

1. Cover the splice area completely with an electrical insulating coating and allow it to dry.
2. Apply 3 layers of half-lapped, PVC electrical tape.
3. Apply 2 layers of butyl-rubber, stretchable tape with liner.
4. Apply 3 layers of half-lapped, PVC, pressure-sensitive, adhesive tape.
5. Cover the entire splice with an electrical insulating coating and allow it to dry.

87-1.03I Connectors and Terminals

Apply connectors and terminals to cables and conductors using a crimping compression tool under the manufacturer's instructions. The tool must prevent opening of the handles until the crimp is completed.

Install crimp-style terminal lugs on stranded conductors smaller than no. 14.

Solder no. 8 and smaller copper conductors to connectors and terminal lugs.

87-1.03J Standards, Poles, Pedestals, and Posts

Install standards, poles, pedestals, and posts under section 56-3.

Ground standards with a handhole by attaching a bonding jumper from the bolt or lug inside the standard to a metal conduit or to the grounding wire in the adjacent pull box. The bonding jumper must be visible when the handhole cover is removed.

Ground standards without a handhole or standards with a slip base by attaching a bonding jumper to all anchor bolts using ground clamps and connecting it to a metal conduit or to the grounding wire in the adjacent pull box. The bonding jumper must be visible after mortar has been placed on the foundation.

87-1.03K Piezoelectric Axle Sensors

Not Used

87-1.03L Utility Service**87-1.03L(1) General**

Install the service equipment early enough to allow the utility to complete its work before completion of the electrical work.

At least 15 days before permanent electrical and telecommunication service is required, request the service connections for permanent installations. The Agency arranges with the utilities for completion of the connections and pays all costs and fees required by the utilities.

87-1.03L(2) Electric Service**87-1.03L(2)(a) General**

If service equipment is to be installed on a utility-owned pole, furnish and install the conduit, conductors, pull boxes, and other necessary material to complete the service installation. The service utility decides the position of the riser and equipment on the pole.

87-1.03L(2)(b) Electric Service for Irrigation

Establishing electric service for irrigation includes installing conduit, conductors, and pull boxes and making connections from the service point to the irrigation controllers.

87-1.03L(2)(c) Electric Service for Booster Pumps

Establishing electric service for a booster pump includes installing conduit, conductors, and pull boxes and making connections from the service point to the booster pump enclosure.

87-1.03L(3) Telecommunications Service

Establishing telecommunication service includes installing conduit, conductors, and pull boxes and making connections from the service point to the telephone demarcation cabinet.

87-1.03M Photoelectric Controls

Mount the photoelectric unit on the top of the pole for Type I, II, and III photoelectric controls. Use mounting brackets where pole-top mounting is not possible. Orient the photoelectric unit to face north.

~~Mount the enclosure at a height of 6 feet above finished grade on the same standard as the photoelectric unit.~~

~~Install a minimum 100 VA, 480/120 V(ac) transformer in the contactor enclosure to provide 120 V(ac) for the photoelectric control unit when switching 480 V(ac), 60 Hz circuits.~~

87-1.03N Fused Splice Connectors

Install a fuse splice connector with a fuse in each ungrounded conductor for luminaires, except for overhead sign luminaires. The connector must be located in the pull box adjacent to the luminaires.

If the pull box for the roadway luminaire is tamper resistant, install a fuse splice connector with 10 A fuse in the pull box and an additional fuse splice connector with a 5 A fuse in the handhole.

~~Install a fuse splice connector with a fuse on primary side of transformer.~~

Crimp the connector terminals onto the ungrounded conductors using a tool under the manufacturer's instructions. Insulate the terminals and make them watertight.

87-1.03O Grounding Electrodes

Install a grounding electrode for each cabinet, service equipment enclosure, and transformer.

Attach a grounding conductor from the electrode using either a ground clamp or exothermic weld. Connect the other end of the conductor to the cabinet, service equipment enclosure, and transformer.

SECTION 87

ELECTRICAL SYSTEMS

87-1.03P Service Equipment Enclosures

Not Used

87-1.03Q Cabinets

Not Used

87-1.03R Signal Heads

Not Used

87-1.03S Pedestrian Signal Heads

Not Used

87-1.03T Accessible Pedestrian Signals

Not Used

87-1.03U Push Button Assemblies

Not Used

87-1.03V Detectors

Not Used

87-1.03W Sealants

Not Used

87-1.03X Reserved

87-1.03Y Transformers

Not Used

87-1.03Z Reserved

87-1.04 PAYMENT

Not Used

87-2 LIGHTING SYSTEMS

87-2.01 GENERAL

87-2.01A Summary

Section 87-2 includes specifications for constructing lighting systems.

Lighting system includes:

1. Foundations
2. Pull boxes
3. Conduit
4. Conductors
5. Standards
6. Luminaires
7. Service equipment enclosure
8. Photoelectric control
9. Fuse splice connectors
10. High mast lighting assemblies

The components of a lighting system are shown on the project plans.

87-2.01B Definitions

Reserved

87-2.01C Submittals

Submit a certificate of compliance and test data for the high mast lighting luminaires.

SECTION 87

ELECTRICAL SYSTEMS

87-2.01D Quality Assurance

Reserved

87-2.02 MATERIALS

87-2.02A General

Reserved

87-2.02B High Mast Lighting Assemblies

Not Used

87-2.02C Soffit and Wall-Mounted Luminaires

Not Used

87-2.03 CONSTRUCTION

87-2.03A General

Set the foundations for standards such that the mast arm is perpendicular to the centerline of the roadway.

Tighten the cap screws of the luminaire's clamping bracket to 10 ft-lb for roadway luminaires.

Label the month and year of the installation inside the luminaire housing's door.

Perform the conductor and operational tests for the system.

87-2.03B High Mast Lighting Assemblies

Not Used

87-2.03C Soffit and Wall-Mounted Luminaires

Not Used

87-2.04 PAYMENT

Not Used

87-3 SIGN ILLUMINATION SYSTEMS

Not Used

87-4 SIGNAL AND LIGHTING SYSTEMS

87-4.01 GENERAL

87-4.01A Summary

Section 87-4 includes specifications for constructing signal and lighting systems.

Signal and lighting system includes:

1. Foundations
2. Pull boxes
3. Conduit
4. Conductors and cables
5. Standards
6. Signal heads
7. Internally illuminated street name signs
8. Service equipment enclosure
9. Agency-furnished controller assembly
10. Detectors
11. Telephone demarcation cabinet
12. Accessible pedestrian signals
13. Push button assemblies
14. Pedestrian signal heads
15. Luminaires

SECTION 87

ELECTRICAL SYSTEMS

- 16. Photoelectric control
- 17. Fuse splice connectors
- 18. Battery backup system
- 19. Flashing beacons
- 20. Flashing beacon control assembly

The components of a signal and lighting system are shown on the project plans.

87-4.01B Definitions

Reserved

87-4.01C Submittals

Submit shop drawings showing the message for each internally illuminated street sign, including the size of letters, symbols, and arrows.

87-4.01D Quality Assurance

Reserved

87-4.01D(1) General

Reserved

87-4.01D(2) Quality Control

87-4.01D(2)(a) General

Reserved

87-4.02 MATERIALS

87-4.02A General

Reserved

87-4.02B Battery Backup System

Not Used

87-4.02C Internally Illuminated Street Name Signs

Not Used

87-4.03 CONSTRUCTION

87-4.03A General

Set the foundations for standards such that the mast arm is perpendicular to the centerline of the roadway.

Tighten the cap screws of the luminaire's clamping bracket to 10 ft-lb for LED and low-pressure luminaires.

Label the month and year of the installation inside the luminaire housing's door.

Perform the conductor and operational tests for the system.

87-4.03B Battery Backup System Cabinets

Not Used

87-4.03C Internally Illuminated Street Name Signs

Not Used

87-4.04 PAYMENT

Not Used

87-5 RAMP METERING SYSTEMS

Not Used

87-6 TRAFFIC MONITORING STATION SYSTEMS

Not Used

87-7 FLASHING BEACON SYSTEMS

Not Used

87-8 PEDESTRIAN HYBRID BEACON SYSTEMS

Not Used

87-9–87-11 RESERVED

87-12 CHANGEABLE MESSAGE SIGN SYSTEMS

Not Used

87-13 RESERVED

87-14 RADAR SPEED FEEDBACK SIGN SYSTEMS

Not Used

87-15–87-17 RESERVED

87-18 INTERCONNECTION CONDUIT AND CABLE

Not Used

87-19 FIBER OPTIC CABLE SYSTEMS

Not Used

87-20 TEMPORARY ELECTRICAL SYSTEMS

Not Used

87-21 EXISTING ELECTRICAL SYSTEMS

87-21.01 GENERAL

Section 87-21 includes general specifications for performing work on existing electrical systems.

87-21.02 MATERIALS

Not Used

87-21.03 CONSTRUCTION

87-21.03A General

You may abandon unused underground conduit after pulling out all conductors and removing conduit terminations from the pull boxes.

If standards are to be salvaged, remove:

1. All components
2. Mast arms from the standards
3. Luminares, signal heads, and signal mounting assemblies from the standards and mast arms

Unless otherwise directed, salvage County standards, pedestals, poles, and posts that are shown to be salvaged. Deliver salvaged County material to the storage yard located 28251 Industrial Blvd in Hayward. Coordinate delivery of salvaged material in advance with Agency representative Carlos Romero, County Traffic Signal Supervisor, phone: 510-670-5537, email: CarlosR@acpwa.org.

If the existing material is unsatisfactory for reuse and the Engineer orders you to replace it with new material, replacing the existing material with new material is change order work.

If the removed electrical equipment is to be reinstalled, supply all materials and equipment, including signal mounting assemblies, anchor bolts, nuts, washers, and concrete, needed to complete the new installation.

SECTION 87

ELECTRICAL SYSTEMS

87-21.03B Maintaining Existing Electrical Systems

87-21.03B(1) General

Maintain the existing electrical system in working order during the progress of the work. Conduct your operations to avoid damage to the elements of the systems.

87-21.03B(2) Maintaining Existing Traffic Management System Elements During Construction

Not Used

87-21.03C Modifying Existing Electrical Systems

Modify electrical systems as shown.

87-21.03D Removing Existing Electrical Systems

The components to be removed are shown on the project plans. Remove foundations of systems shown to be removed under section 15-1.03B, "Removing Concrete."

87-21.04 PAYMENT

Not Used

DIVISION XI MATERIALS

Replace section 89 with:

89 AGGREGATE

Not Used

Replace section 90 with:

90 CONCRETE

90-1 GENERAL

90-1.01 GENERAL

90-1.01A Summary

Section 90-1 includes general specifications for furnishing, curing, and protecting concrete.

Concrete must be composed of cementitious material, fine aggregate, coarse aggregate, admixtures if used, and water.

PCC must comply with the specifications for concrete.

90-1.01B Definitions

CIP structural concrete members: CIP components of bridge structures, piling, retaining walls, sound walls, box culverts, drainage inlets, approach slabs, bridge railing, and bridge barriers.

free water: Total water in the concrete mixture minus the water absorbed by the aggregates in reaching a saturated surface-dry condition.

reclaimed aggregate: Aggregate that has been recovered from plastic concrete by washing away the cementitious material.

90-1.01C Submittals

90-1.01C(1) General

Reserved

90-1.01C(2) Aggregate Gradation

Before starting concrete work, submit the gradation of the primary aggregate nominal sizes. If the aggregate source changes, submit the new gradation before using the aggregate.

If a primary coarse aggregate or the fine aggregate is separated into 2 or more sizes, submit the gradation and proposed proportions of each size combined mathematically to show 1 proposed gradation. Show the percentage passing for each applicable sieve size.

90-1.01C(3) Cementitious Materials

Submit a certificate of compliance for cementitious materials. Include the source name and location.

If the cementitious material is delivered directly to the job site, the certificate of compliance must be signed by the cementitious material supplier.

If the cementitious material is used in ready-mixed concrete, the certificate of compliance must be signed by the concrete manufacturer.

If blended cement is used, the certificate of compliance must include a statement signed by the blended cement supplier that shows the actual percentage of SCM, by weight, in the blend. Determine the weight of SCM by using a weighing device or by chemical analysis.

90-1.01C(4) Admixtures

If you propose to use an admixture from the Authorized Material List for chemical admixture for use in concrete, submit a certificate of compliance from the manufacturer certifying that the admixture furnished is the same as that previously authorized.

90-1.01C(5) Curing Compound

For each batch of curing compound delivered to the job site or casting site, submit:

1. Split curing compound test samples to METS. The test samples must be from the shipping containers at the manufacturer's source of supply.
2. Certificate of compliance to the Engineer and to METS. The certificate of compliance must include:
 - 2.1. Test results for the tests specified in section 90-1.01D(6).

- 2.2. Certification that the material was tested within 1 year before use.

If the curing compound is shipped in tanks or tank trucks, submit a shipping invoice with each load. The invoice must show the same information specified for container labels in section 90-1.03B(3)(b).

90-1.01C(6) Mix Design

90-1.01C(6)(a) General

Submit the concrete mix design before using the concrete in the work and before changing the mix proportions or an aggregate source.

90-1.01C(6)(b) Cast-In-Place Structural Concrete Members

For CIP structural concrete members, submit with your mix design results from the tests specified in 90-1.01D(10)(d) and the results from the tests shown in the following table:

Quality characteristic	Test method
Specific gravity and absorption of coarse aggregate	ASTM C127
Specific gravity and absorption of fine aggregate	ASTM C128
Duability index for fine aggregate	California Test 229
Soundness	California Test 214
Resistance to degradation	ASTM C131
Organic impurities	California Test 213
Chloride concentration of water for washing aggregates and mixing concrete	California Test 422
Sulfate concentration of water for washing aggregates and mixing concrete	California Test 417
Impurities in water for washing aggregates and mixing concrete	ASTM C191 or ASTM C266 and ASTM C109

90-1.01C(7) Concrete Delivery

Submit a weighmaster certificate as an informational submittal with each load of concrete delivered to the job site.

The weighmaster certificate must show:

1. Mix identification number.
2. Nonrepeating load number.
3. Date and time the materials were batched.
4. Total quantity of water added to the load.
5. For transit-mixed concrete, the revolution counter reading at the time the truck mixer is charged with cement.
6. Actual scale weights in pounds for the ingredients batched. Do not substitute theoretical or target batch weights for actual scale weights.

Submit weighmaster certificates in printed form or, if authorized, in electronic media. Present electronic media in a tab-delimited format on a CD or DVD. Captured data for the ingredients represented by each batch must be a line-feed, carriage-return, and one line separated record with sufficient fields for the specified data.

You may submit a weighmaster certificate with a separate certificate that lists the actual batch weights or measurements for a load of concrete if both certificates are delivered to the job site and are imprinted with the same nonrepeating load number that is unique to the Contract.

90-1.01C(8) Testing

90-1.01C(8)(a) General

If the concrete is tested for shrinkage, submit the test data with the mix design.

If prequalification is specified, submit certified test data or trial batch test reports under section 90-1.01D(5)(b).

If 56 days are allowed for the concrete to attain the strength described, submit test results under section 90-1.01D(5)(a).

90-1.01C(8)(b) Cast-In-Place Structural Concrete Members

For CIP structural concrete members, submit test results within 3 business days after completing each QC test.

For CIP structural concrete members, include the following with the test results:

1. Contract number
2. Mix design number
3. Test sample identification number
4. Date and time of test
5. Batch plant
6. Batch number
7. Bridge number and description of element
8. Supporting data and calculations
9. Name, certification number, and signature of the QC tester

If additional compressive strength test results are needed for CIP structural concrete members to facilitate your schedule, submit a plot of the strength projection curve.

90-1.01C(9) Stationary Mixer Certification

If you weigh the SCM cumulatively with the cement for concrete completely mixed in a stationary mixer, submit certification of the stationary mixer under section 90-1.02F(4)(c).

90-1.01C(10) Protecting Concrete

If requested, submit a plan for protecting the concrete.

90-1.01C(11) Quality Control Plan for Cast-In-Place Structural Concrete Members

Section 90-1.01C(11) applies to CIP structural concrete members.

Submit 3 copies of the QC plan for review.

Submit an amended QC plan or an addendum to the QC plan when there are any changes to:

1. Concrete plants
2. Testing laboratories
3. Plant certification or laboratory accreditation status
4. Tester or inspector qualification status
5. QC personnel
6. Procedures and equipment
7. Material sources
8. Material testing

Allow the Agency 5 business days to review an amended QC plan or an addendum to the QC plan.

90-1.01C(12) Concrete Materials Quality Control Summary Report for Cast-In-Place Structural Concrete Members

Section 90-1.01C(12) applies to CIP structural concrete members.

During concrete production for CIP structural concrete members, submit a concrete materials QC summary report at least once a month. The report must include:

1. Inspection reports
2. Test results
3. Documentation of:

- 3.1. Test result evaluation by the QC manager
- 3.2. Any discovered problems or deficiencies and the corrective actions taken
- 3.3. Any testing of repair work performed
- 3.4. Any deviations from the specifications or regular practices with explanation
4. Certificate of compliance for the structural concrete material signed by the QC manager. The certificate must state that the information contained in the report is accurate, the minimum testing frequencies specified in section 90-1.01D(10)(d) are met, and the materials comply with the Contract.

90-1.01C(13) Polymer Fibers

For concrete used in concrete bridge decks or PCC deck overlays, submit:

1. Fiber manufacturer's product data and application instructions
2. Certificate of compliance for each shipment and type of fiber

90-1.01D Quality Assurance**90-1.01D(1) General**

If requested, furnish test samples of the freshly mixed concrete and provide satisfactory facilities for obtaining the test samples.

90-1.01D(2) Cementitious Material Content

Adjust the batch proportions as necessary to produce concrete having the specified cementitious material content.

The Engineer verifies compliance with the specified cementitious material content by testing under California Test 518 for cement content. For testing purposes, SCM is considered to be cement.

For all concrete except minor concrete, if the cementitious material, portland cement, or SCM content is less than the minimum required and is not within the batching tolerances allowed under section 90-1.02F(3), you must remove the concrete. If the Engineer determines that the concrete is structurally adequate, the concrete may remain in place and \$0.25 is deducted for each pound of cementitious material, portland cement, or SCM less than the minimum required. No deductions are made based on the results of California Test 518.

90-1.01D(3) Shrinkage

If shrinkage limitations are specified, test the concrete under AASHTO T 160, modified as follows:

1. Prepare specimens that have a 4 by 4-inch cross section.
2. Remove each specimen from the mold 23 ± 1 hours after mixing the concrete and place the specimen in lime water at 73 ± 3 degrees F until 7 days age.
3. Take a comparator reading at 7 days age and record it as the initial reading.
4. Store the specimens in a humidity-controlled room maintained at 73 ± 3 degrees F and 50 ± 4 percent relative humidity for the remainder of the test.
5. Take subsequent readings at 7, 14, 21, and 28 days drying.

Perform AASHTO T 160 testing at a laboratory that is accredited to perform AASHTO T 160 or that maintains a current rating of 3 or better for the Cement and Concrete Reference Laboratory concrete proficiency sample program.

Shrinkage test data authorized by the Agency no more than 3 years before the 1st day of the Contract is authorized for the entire Contract. The test data must be for concrete with similar proportions and using the same materials and material sources to be used on the Contract. Concrete is considered to have similar proportions if no more than 2 mix design elements are varied and the variation is within the tolerances shown in the following table:

Mix design element	Tolerance (±)
Water to cementitious material ratio	0.03
Total water content (%)	5
Coarse aggregate content (%)	10
Fine aggregate content (%)	10
SCM content (%)	5
Admixture as originally dosed ^a (%)	25

^aAdmixtures must be the same brand.

90-1.01D(4) Concrete Uniformity

The Engineer determines the uniformity of concrete mixtures based on differences in test results between 2 test samples of mixed concrete from the same batch for the following tests:

1. California Test 533 if the mix design specifies a penetration value
2. ASTM C143 if the mix design specifies a slump value
3. California Test 529

90-1.01D(5) Compressive Strength

90-1.01D(5)(a) General

Section 90-1.01D(5) applies for either of the following cases:

1. Concrete is designated by compressive strength.
2. Attaining a minimum concrete compressive strength is specified as a prerequisite to applying loads or stresses to a concrete structure or member.

If the 28-day compressive strength described is 3,600 psi or greater, the concrete is designated by compressive strength.

If the concrete is designated by compressive strength, the strength of concrete that is not steam cured is determined from cylinders cured under Method 1 of California Test 540.

If attaining a minimum concrete compressive strength is specified as a prerequisite to applying loads or stresses to a concrete structure or member, cylinders for concrete that is not steam cured are cured under Method 2 of California Test 540 and the concrete compressive strength is evaluated based on individual tests.

For concrete with a described 28-day compressive strength greater than 3,600 psi, 42 days are allowed to attain the strength described.

Except for concrete specified to be in a freeze-thaw area, 56 days are allowed to attain the strength described if the cementitious material satisfies the following equation:

$$[(41 \times UF) + (19 \times F) + (11 \times SL)]/TC \geq 7.0$$

where:

F = natural pozzolan or fly ash complying with AASHTO M 295, Class F or N, including the quantity in blended cement, lb/cu yd. F is equivalent to the sum of FA and FB as defined in section 90-1.02B(3).

SL = GGBFS, including the quantity in blended cement, lb/cu yd

UF = silica fume, metakaolin, or UFFA, including the quantity in blended cement, lb/cu yd

TC = total quantity of cementitious material used, lb/cu yd

For concrete satisfying the equation above, test for the compressive strength at least once every 500 cu yd at 28, 42, and 56 days. Submit the test results to the Engineer and to METS, Attention: Office of Structural Materials, Concrete Materials Testing Branch.

The Engineer determines the concrete compressive strength from test cylinders:

1. Made from concrete sampled under California Test 539
2. Molded and initially field cured under California Test 540
3. Cured and tested under California Test 521

A compressive strength test represents no more than 300 cu yd of concrete and consists of the average compressive strength of 2 cylinders made from material taken from a single load of concrete. If a cylinder shows evidence of improper sampling, molding, or testing, the cylinder is discarded and the test consists of the compressive strength of the remaining cylinder.

If a single compressive strength test result is below the strength described at the maximum age specified or allowed, or if the compressive strength of concrete tested at 7 days indicates to the Engineer that the concrete will not attain the strength described at the maximum age specified or allowed, correct the mix design or concrete fabrication procedures and obtain authorization before you place additional concrete.

If a single compressive strength test result is below the strength described at the maximum age specified or allowed, the concrete represented by the test is subject to one of the following actions:

1. If the compressive strength is at least 95 percent of the strength described, \$10 per cubic yard of concrete is deducted.
2. If the compressive strength is below 95 percent of the strength described but is at least 85 percent of the strength described, \$15 per cubic yard of concrete is deducted.
3. If the compressive strength is below 85 percent of the strength described, you must remove the concrete.

If a strength test result at the maximum age specified or allowed is below the strength described but is at least 85 percent of the strength described, the deductions specified above apply unless you obtain and submit evidence that the strength of the concrete placed in the work is greater than or equal to the strength described and this evidence is accepted by the Engineer.

If a strength test result at the maximum age specified or allowed is below 85 percent of the strength described, you must remove the concrete represented by the test unless you obtain and submit evidence that the strength of the concrete placed in the work is at least 85 percent of the strength described and this evidence is accepted by the Engineer.

If the evidence consists of tests made on cores taken from the work, obtain and test the cores under ASTM C42.

90-1.01D(5)(b) Prequalification

If the concrete has a described 28-day compressive strength greater than 3,600 psi, or if prequalification is specified, prequalify the materials, mix proportions, mixing equipment, and procedures proposed for use in the work before placing the concrete.

Submit certified test data or trial batch test reports based on the same materials, mix proportions, mixing equipment, procedures, and batch size proposed for use in the work.

Certified test data must show that:

1. Results of 90 percent or more of at least 20 consecutive tests exceed the compressive strength described at the maximum number of days specified or allowed and none of the test results are less than 95 percent of the strength described
2. All tests are the most recent tests made on concrete of the proposed mix design and were made within 1 year of the proposed use of the concrete

Trial batch test reports must show that:

1. Average compressive strength for 5 consecutive concrete cylinders taken from a single batch and tested at not more than the maximum age specified or allowed is at least 600 psi greater than the 28-day compressive strength described
2. No individual cylinder has a strength less than the strength described at the maximum age specified or allowed

3. Data contained in the report is from trial batches produced within 1 year of the proposed use of the concrete

If air entrainment is specified, the air content of the trial batches must be greater than or equal to the air content specified for the concrete without reduction due to tolerances.

Perform tests under the appropriate California Test methods or comparable ASTM test methods. Use testing equipment that is in good condition and properly calibrated. If tests are performed during the Contract, notify the Engineer in advance so that the Engineer can witness the test procedures.

Certified test data and trial batch reports must include:

1. Date of mixing
2. Mixing equipment and procedures
3. Batch size in cubic yards
4. Weight, type, and source for each ingredient
5. Penetration or slump as specified in section 90-1.02G(6)
6. Air content if an air-entraining admixture is used
7. Concrete age at the time of testing
8. Compressive strength for each cylinder tested
9. Signature of an official of the testing firm

If authorized, you may use the concrete from trial batches in the work at locations where lower quality concrete is required.

Any change to the prequalified materials, mix proportions, mixing equipment, or procedures that could result in a concrete strength below that described requires additional prequalification by trial batch testing.

90-1.01D(6) Curing Compound

Test each batch of curing compound delivered to the job site or casting site for:

1. Water loss at 24 hours under California Test 534
2. Reflectance under ASTM E1347
3. Viscosity under ASTM D2196
4. Nonvolatile content under ASTM D2369
5. Pigment content under ASTM D3723

A batch must be no larger than 10,000 gal.

The Engineer samples the curing compound at any of the following:

1. Manufacturer's supply source
2. Job site or casting site

The curing compound sampled from shipping containers from the manufacturer's supply source or from the job site must match the test results for viscosity, nonvolatile content, and pigment content within the tolerances specified in the precision and bias statements for the test methods.

Additional testing of the curing compound may be required before its use if the compound has not been used within 1 year or if the Engineer believes that the compound may no longer be acceptable.

90-1.01D(7) Qualifications for Cast-In-Place Structural Concrete Members

Section 90-1.01D(7) applies to CIP structural concrete members.

QC laboratory testing personnel must have an ACI Concrete Laboratory Testing Technician, Level 1 certification or an ACI Aggregate Testing Technician, Level 2 certification, whichever certification includes the test being performed.

QC field testing personnel and field and plant inspection personnel must have an ACI Concrete Field Testing Technician, Grade I certification.

90-1.01D(8) Certifications for Cast-In-Place Structural Concrete Members

Each concrete plant used for CIP structural concrete members must have a current:

1. Certification for ready mixed concrete production facilities from the National Ready Mixed Concrete Association. Plant Certification Checklist and supporting documentation must be available upon request.
2. Authorization under the Department's MPQP.

Each QC testing laboratory must be an authorized laboratory with current accreditation from the AASHTO Accreditation Program for the tests performed.

90-1.01D(9) Preconstruction Meeting for Cast-In-Place Structural Concrete Members

Section 90-1.01D(9) applies to CIP structural concrete members.

Before concrete placement, hold a meeting to discuss the requirements for structural concrete QC. The meeting attendees must include the Engineer, the QC manager, and at least 1 representative from each concrete plant performing CIP structural concrete activities for the Contract.

90-1.01D(10) Quality Control**90-1.01D(10)(a) General**

Reserved

90-1.01D(10)(b) Cast-In-Place Structural Concrete Members**90-1.01D(10)(b)(i) General**

Section 90-1.01D(10)(b) applies to CIP structural concrete members.

Develop, implement, and maintain a QC program that includes inspection, sampling, and testing of structural concrete materials for CIP structural concrete members.

Perform all sampling, testing, and inspecting required to control the process and to demonstrate compliance with the Contract and the authorized QC plan.

Provide a QC field inspector at the concrete delivery point while placement activities are in progress.

Provide a testing laboratory and the testing personnel for QC testing.

The QC inspector and the QC manager must be fully authorized by the Contractor to reject material.

QC testers and inspectors must be your employees or must be hired by a subcontractor providing only QC services. QC testers and inspectors must not be employed or compensated by a subcontractor or by other persons or entities hired by subcontractors who will provide other services or materials for the project.

If lightweight concrete, RSC, or SCC is used as structural concrete, you must also comply with the sampling and testing specifications of that section.

90-1.01D(10)(b)(ii) Quality Control Plan

The QC plan must detail the methods used to ensure the quality of the work and provide the controls to produce concrete. The QC plan must include:

1. Names and documentation of certification or accreditation of the concrete plants and testing laboratories to be used
2. Names, qualifications, and copies of certifications for the QC manager and all QC testing and inspection personnel to be used
3. Organization chart showing QC personnel and their assigned QC responsibilities
4. Example forms, including forms for certificates of compliance, hard copy test result submittals, and inspection reports
5. Methods and frequencies for performing QC procedures, including inspections and material testing

6. Procedures to control quality characteristics, including standard procedures to address properties outside of the specified operating range or limits, and example reports to document nonconformances and corrective actions taken
7. Procedures for verifying:
 - 7.1. Materials are properly stored during concrete batching operations
 - 7.2. Batch plants have the ability to maintain the concrete consistency during periods of extreme heat and cold
 - 7.3. Admixture dispensers deliver the correct dosage within the accuracy requirements specified
 - 7.4. Delivery trucks have a valid National Ready Mixed Concrete Association certification card
8. Procedures for verifying that the weighmaster certificate for each load of concrete shows:
 - 8.1. Concrete as batched complies with the authorized concrete mix design weights
 - 8.2. Moisture corrections are being accurately applied to the aggregates
 - 8.3. Cementitious materials are from authorized sources
 - 8.4. Any water that is added after batching at the plant
9. Procedures for visually inspecting the concrete during discharge operations

Allow the Department 5 business days to review an amended QC plan or an addendum to the QC plan.

90-1.01D(10)(b)(iii) Quality Control Manager

Assign a QC manager. The QC manager must have one of the following qualifications:

1. Civil engineering license in the State
2. ACI Concrete Laboratory Testing Technician, Level 1 certification
3. NICET Level II concrete certification
4. ICC Reinforced Concrete Special Inspector certification
5. ASQ Certified Manager of Quality/Organizational Excellence with the qualifying 10 years of experience and body of knowledge in the field of concrete

During concrete placement, the QC manager must be at the plant or job site within 3 hours of receiving notification from the Engineer.

90-1.01D(10)(b)(iv) Quality Control Testing Frequencies

For each mix design used to produce CIP structural concrete, perform sampling and testing in compliance with the following tables:

Aggregate QC Tests

Quality characteristic	Test method	Minimum testing frequency
Aggregate gradation	California Test 202	Once per each day of pour
Sand equivalent	California Test 217	
Cleanness value	California Test 227	
Moisture content of fine aggregate	California Test 226	

Concrete QC Tests

Quality characteristic	Test method	Minimum testing frequency
Slump	ASTM C143/C143M	Once per 100 cu yd or each day of pour, whichever is more frequent, and when requested by the Engineer
Uniformity ^a	ASTM C143/C143M, California Test 533, and California Test 529	When ordered by the Engineer
Air Content, (freeze-thaw area)	California Test 504 ^b	If concrete is air entrained, once per 30 cu yd or each day of pour, whichever is more frequent
Air Content, (non-freeze-thaw area)	California Test 504 ^b	If concrete is air entrained, once per 100 cu yd or each day of pour, whichever is more frequent
Temperature	California Test 557	Once per 100 cu yd or each day of pour, whichever is more frequent
Density	California Test 518	
Compressive Strength ^{c,d}	California Test 521	

^aAs specified in section 90-1.01D(4).

^bUse ASTM C173/C173M for lightweight concrete.

^cMark each cylinder with the Contract number, the date and time of sampling, and the weighmaster certificate number.

^dYou may need additional test samples to facilitate your schedule.

90-1.01D(10)(b)(v) Inspection Reports

Document each inspection performed by a QC inspector in an inspection report that includes:

1. Contract number
2. Mix design number
3. Date and time of inspection
4. Plant location
5. Concrete placement location
6. Batch number
7. Reviewed copies of weighmaster certificates
8. Description of the inspection performed
9. Name, certification number, and signature of the QC inspector

90-1.01D(10)(b)(vi) Rejection of Material

If any of the QC concrete test results fail to comply with the specified requirements, the batch of concrete must not be incorporated in the work. Notify the Engineer. Repeat the QC concrete tests on each subsequent batch until the test results comply with the specified requirements.

If 3 consecutive batches fail to comply with the specified requirements, (1) revise concrete operations as necessary to bring the concrete into compliance and (2) increase the frequency of QC testing. The revisions must be authorized before resuming production. After production resumes, you must receive authorization before returning to the QC testing frequency authorized in the QC plan.

90-1.01D(11) Agency Acceptance**90-1.01D(11)(a) General**

Reserved

90-1.01D(11)(b) Cast-In-Place Structural Concrete Members

The Agency accepts concrete incorporated into CIP structural concrete members based on only the Agency's test results. QC test results will not be used for Agency acceptance.

90-1.02 MATERIALS**90-1.02A General**

Concrete for pavement, approach slabs, and bridge decks must comply with the shrinkage limitations shown in the following table when tested under section 90-1.01D(3):

Type of work	Maximum length change of laboratory cast specimens at 28 days drying (average of 3) (percent)
Paving and approach slab concrete	0.050
Bridge deck concrete	0.032

When tested for uniformity under section 90-1.01D(4), the differences in test results between the 2 concrete test samples must comply with the following:

1. When tested under California Test 533, the difference in penetration values must not exceed 1/2 inch.
2. When tested under ASTM C143, the difference in slump values must not exceed the values shown in the following table:

Average slump, S (in)	Maximum permissible difference (in)
$S < 4$	1
$4 \leq S \leq 6$	1-1/2
$6 < S \leq 9$	2

3. When tested under California Test 529, the difference in the proportion of coarse aggregate must not exceed 170 pounds of aggregate per cubic yard of concrete.

Unless a modulus of rupture is specified, the minimum required compressive strength for concrete must be the greater of either the strength described or 2,500 psi. Proportion the concrete to attain the minimum required compressive strength.

For concrete not designated by compressive strength, the concrete must attain at least 85 percent of the minimum required compressive strength when tested at 28 days.

For new bridge decks or PCC deck overlays, fibers must comply with ASTM D7508. Microfibers must be from 1/2 to 2 inches long. Macrofibers must be from 1 to 2-1/2 inches long.

90-1.02B Cementitious Materials**90-1.02B(1) General**

The cementitious materials type and brand must be on the Authorized Material List for cementitious material for use in concrete when the mix design is submitted.

Unless otherwise specified, the cementitious material must be one of the following:

1. Combination of Type II or V portland cement and SCM
2. Blended cement

The cementitious materials used in CIP concrete for exposed surfaces of similar elements of a structure must be from the same sources and of the same proportions.

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Protect cementitious materials from moisture until used.

Place sacked cementitious materials in a pile to allow access for tallying, inspecting, and identifying each shipment.

Provide facilities that ensure the cementitious materials to be used in the work are kept separate from each other and from other cementitious materials.

A storage silo containing a cementitious material must be emptied before using the silo for a different cementitious material. Blended cements with a percentage of SCM differing by more than 2 percent are considered different cementitious materials.

Sample cementitious materials under California Test 125.

90-1.02B(2) Cement

Portland cement must comply with ASTM C150, except the C_3S content of Type II cement must not exceed 65 percent.

Blended cement must comply with portland blast-furnace slag cement, Type IS (MS), or portland-pozzolan cement, Type IP (MS), specified in AASHTO M 240, except:

1. Maximum limits on pozzolan content do not apply
2. Blended cement must be composed of Type II or V cement and SCM produced by one of the following methods:
 - 2.1. Intergrinding of portland cement clinker and granulated blast furnace slag, GGBFS, or pozzolan
 - 2.2. Blending of portland cement and either GGBFS or finely divided pozzolan
 - 2.3. Combination of intergrinding and blending

Types II, III, and V portland cement must comply with the following:

1. Alkali content must not exceed 0.60 percent by mass of alkalis as $Na_2O + 0.658 K_2O$ when determined under AASHTO T 105.
2. Autoclave expansion must not exceed 0.50 percent.

Type III portland cement may be used only if specified or authorized.

90-1.02B(3) Supplementary Cementitious Materials

Each SCM must be one of the following:

1. Fly ash complying with AASHTO M 295, Class F, and either of the following:
 - 1.1. Available alkali as $Na_2O + 0.658 K_2O$ must not exceed 1.5 percent when tested under ASTM C311.
 - 1.2. Total alkali as $Na_2O + 0.658 K_2O$ must not exceed 5.0 percent when tested under AASHTO T 105.
2. UFFA complying with AASHTO M 295, Class F, and the chemical and physical requirements shown in the following 2 tables:

Chemical quality characteristic	Requirement (percent)
Sulfur trioxide (SO_3) (max)	1.5
Loss on ignition (max)	1.2
Available alkalis as $Na_2O + 0.658 K_2O$ (max)	1.5

Physical quality characteristic	Requirement (percent)
Particle size distribution	
Less than 3.5 microns (min)	50
Less than 9.0 microns (min)	90
Strength activity index with portland cement	
7 days (% of control, min)	95
28 days (% of control, min)	110
Expansion at 16 days when testing project materials under ASTM C1567 ^a (max)	0.10

^aIn the test mix, at least 12 percent, by weight, of the Type II or V portland cement must be replaced with UFFA.

3. Raw or calcined natural pozzolans complying with AASHTO M 295, Class N, and either of the following:
 - 3.1. Available alkali as $\text{Na}_2\text{O} + 0.658 \text{ K}_2\text{O}$ must not exceed 1.5 percent when tested under ASTM C311.
 - 3.2. Total alkali as $\text{Na}_2\text{O} + 0.658 \text{ K}_2\text{O}$ must not exceed 5.0 percent when tested under AASHTO T 105.
4. Metakaolin complying with AASHTO M 295, Class N, and the chemical and physical requirements for the quality characteristics shown in the following 2 tables:

Chemical quality characteristic	Requirement (percent)
Silicon dioxide (SiO_2) + aluminum oxide (Al_2O_3) (min)	92.0
Calcium oxide (CaO) (max)	1.0
Sulfur trioxide (SO_3) (max)	1.0
Loss on ignition (max)	1.2
Available alkalies as $\text{Na}_2\text{O} + 0.658 \text{ K}_2\text{O}$ (max)	1.0

Physical quality characteristic	Requirement (percent)
Particle size distribution less than 45 microns (min)	95
Strength activity index with portland cement	
7 days (% of control, min)	100
28 days (% of control, min)	100

5. GGBFS complying with AASHTO M 302, Grade 100 or 120.
6. Silica fume complying with AASHTO M 307, with a minimum reduction in mortar expansion of 80 percent when using the cement from the proposed mix design.

Fly ash from different sources may be commingled at uncontrolled ratios if:

1. Each source produces fly ash complying with AASHTO M 295, Class F
2. At the time of commingling, each fly ash has:
 - 2.1. Running average of relative density that does not differ from any other fly ash by more than 0.25
 - 2.2. Running average of loss on ignition that does not differ from any other fly ash by more than 1 percent
3. Final commingled fly ash complies with AASHTO M 295, Class F
4. Fly ash supplier is responsible for testing the commingled fly ash

The quantity of portland cement and SCM in concrete must comply with the minimum cementitious material content specified.

The SCM content in concrete must comply with one of the following:

- Any combination of portland cement and at least 1 SCM, satisfying equations 1 and 2:

Equation 1:

$$[(25 \times UF) + (12 \times FA) + (10 \times FB) + (6 \times SL)]/MC \geq X$$

where:

UF = silica fume, metakaolin, or UFFA, including the quantity in blended cement, lb/cu yd

FA = natural pozzolan or fly ash complying with AASHTO M 295, Class F or N, with a CaO content of up to 10 percent, including the quantity in blended cement, lb/cu yd

FB = natural pozzolan or fly ash complying with AASHTO M 295, Class F or N, with a CaO content of greater than 10 percent and up to 15 percent, including the quantity in blended cement, lb/cu yd

SL = GGBFS, including the quantity in blended cement, lb/cu yd

MC = minimum quantity of cementitious material specified, lb/cu yd

X = 1.8 for innocuous aggregate, 3.0 for all other aggregate

Equation 2:

$$MC - MSCM - PC \geq 0$$

where:

MC = minimum quantity of cementitious material specified, lb/cu yd

MSCM = minimum sum of SCMs that satisfies equation 1, lb/cu yd

PC = quantity of portland cement, including the quantity in blended cement, lb/cu yd

- 15 percent Class F fly ash with at least 48 oz of LiNO₃ solution added per 100 lb of portland cement. The CaO content of the fly ash must not exceed 15 percent.

90-1.02C Aggregates

90-1.02C(1) General

Both the coarse and fine aggregate must be on the Authorized Material List for the aggregate used in concrete to be considered innocuous.

Aggregates must be free from deleterious coatings, clay balls, roots, bark, sticks, rags, and other extraneous material.

Provide safe and suitable facilities, including splitting devices, for obtaining aggregate test samples under California Test 125.

Aggregates must have:

- Characteristics that enable the production of workable concrete within the limits of water content specified in section 90-1.02G(6).
- No more than 10 percent loss when tested for soundness under California Test 214. The soundness requirement does not apply to fine aggregate if the durability index of the fine aggregate is 60 or greater when tested under California Test 229.

Each cleanness value, sand equivalent, or aggregate gradation test represents no more than 300 cu yd of concrete or 1 day's pour, whichever is smaller.

If the results of any 1 or more of the cleanness value, sand equivalent, or aggregate gradation tests do not comply with the requirements for operating range, but all comply with the requirements for contract compliance:

- Suspend the concrete placement at the completion of the current pour

2. Do not restart the concrete placement until test results or other information show that the next material to be used in the work complies with the requirements for operating range

If the results of either or both of the cleanness value and coarse aggregate gradation tests do not comply with the requirements for contract compliance, you must remove the concrete represented by the tests. If the Engineer determines that the concrete is structurally adequate, the concrete may remain in place and \$3.50 per cubic yard for paving concrete and \$5.50 per cubic yard for other concrete is deducted for the concrete represented by these tests and left in place.

If the results of either or both of the sand equivalent and fine aggregate gradation tests do not comply with the requirements for contract compliance, you must remove the concrete represented by the tests. If the Engineer determines that the concrete is structurally adequate, the concrete may remain in place and \$3.50 per cubic yard for paving concrete and \$5.50 per cubic yard for other concrete is deducted for the concrete represented by these tests and left in place.

The 2 preceding paragraphs apply individually to the contract compliance requirements for coarse and fine aggregate. If both coarse and fine aggregate do not comply with the contract compliance requirements, both paragraphs apply. The deductions specified in those paragraphs are in addition to any deductions made under section 90-1.01D(2).

90-1.02C(2) Coarse Aggregate

Coarse aggregate must consist of gravel, crushed gravel, crushed rock, ~~reclaimed aggregate~~, crushed air-cooled iron blast furnace slag, or a combination of these.

Do not use crushed air-cooled iron blast furnace slag in reinforced or PS concrete.

~~Reclaimed aggregate must comply with the specifications for aggregate.~~

Coarse aggregate must have the requirements for the quality characteristics shown in the following table:

Quality characteristic	Test method	Requirement
Loss in Los Angeles rattler after 500 revolutions (% max)	California Test 211	45
Cleanness value		
Operating range (min)	California Test 227	75
Contract compliance (min)	California Test 227	71

For cleanness value, an operating range limit of 71 minimum and a contract compliance limit of 68 minimum apply if you submit a certificate of compliance certifying that:

1. Coarse aggregate sampled at the completion of processing at the aggregate production plant had a cleanness value of at least 82 when tested under California Test 227
2. Prequalification tests performed under California Test 549 showed that the aggregate would develop a relative strength of at least 95 percent and have a relative shrinkage of no more than 105 percent based on concrete

90-1.02C(3) Fine Aggregate

Fine aggregate must consist of natural sand, manufactured sand produced from larger aggregate, or a combination of these. Manufactured sand must be well graded.

Fine aggregate must have the requirements for the quality characteristics shown in the following table:

Quality characteristic	Test method	Requirement
Organic impurities	California Test 213	Satisfactory ^a
Sand equivalent:		
Operating range (min)	California Test 217	75
Contract compliance (min)	California Test 217	71

^aFine aggregate that develops a color darker than the reference standard color may be authorized if 95 percent relative mortar strength is achieved when tested under ASTM C87.

For sand equivalent, an operating range limit of 71 minimum and a contract compliance limit of 68 minimum apply if you submit a certificate of compliance certifying that:

1. Fine aggregate sampled at the completion of processing at the aggregate production plant had a sand equivalent value of at least 82 when tested under California Test 217
2. Prequalification tests performed under California Test 549 showed that the aggregate would develop a relative strength of at least 95 percent and have a relative shrinkage of no more than 105 percent based on concrete

90-1.02C(4) Aggregate Gradation

90-1.02C(4)(a) General

Proposed aggregate gradations must be within the percentage passing limits shown in the following table:

Primary aggregate nominal size	Sieve size	Limits of gradation (% passing)
1-1/2 x 3/4 inch	1 in	19–41
1 inch x No. 4	3/4 in	52–85
1 inch x No. 4	3/8 in	15–38
1/2 inch x No. 4	3/8 in	40–78
3/8 inch x No. 8	3/8 in	50–85
Fine aggregate	No. 16	55–75
Fine aggregate	No. 30	34–46
Fine aggregate	No. 50	16–29

The Engineer may waive, in writing, the specifications for gradation if in the Engineer's opinion furnishing the gradation is not necessary for the work.

90-1.02C(4)(b) Coarse Aggregate Gradation

Coarse aggregate must be graded within the limits shown in the following table for each size of coarse aggregate:

Sieve size	Primary aggregate nominal sizes							
	1-1/2 x 3/4 inch		1 inch x No. 4		1/2 inch x No. 4		3/8 inch x No. 8	
	Operating Range (% passing)	Contract Compliance (% passing)	Operating Range (% passing)	Contract Compliance (% passing)	Operating Range (% passing)	Contract Compliance (% passing)	Operating Range (% passing)	Contract Compliance (% passing)
2 inch	100	100	--	--	--	--	--	--
1-1/2 inch	88–100	85–100	100	100	--	--	--	--
1 inch	X ± 18	X ± 25	88–100	86–100	--	--	--	--
3/4 inch	0–17	0–20	X ± 15	X ± 22	100	100	--	--
1/2 inch	--	--	--	--	82–100	80–100	100	100
3/8 inch	0–7	0–9	X ± 15	X ± 22	X ± 15	X ± 22	X ± 15	X ± 20
No. 4	--	--	0–16	0–18	0–15	0–18	0–25	0–28
No. 8	--	--	0–6	0–7	0–6	0–7	0–6	0–7

NOTE: "X" is the percent passing of the gradation that you propose to furnish for the specific sieve size under section 90-1.02C(4)(a).

Furnish coarse aggregate for the 1-1/2-inch maximum combined aggregate gradation under section 90-1.02C(4)(d) in 2 or more primary aggregate nominal sizes. You may separate each primary aggregate nominal size into 2 sizes and store them separately, provided that the combined material complies with the gradation specifications for the primary aggregate nominal size.

You may separate the coarse aggregate for the 1-inch maximum combined aggregate gradation under section 90-1.02C(4)(d) into 2 sizes and store them separately, provided that the combined material complies with the gradation specifications for the 1 inch x No. 4 primary aggregate nominal size.

90-1.02C(4)(c) Fine Aggregate Gradation

Fine aggregate must be graded within the limits shown in the following table:

Sieve size	Operating range (% passing)	Contract compliance (% passing)
3/8 inch	100	100
No. 4	95–100	93–100
No. 8	65–95	61–99
No. 16	X ± 10	X ± 13
No. 30	X ± 9	X ± 12
No. 50	X ± 6	X ± 9
No. 100	2–12	1–15
No. 200	0–8	0–10

NOTE: "X" is the percent passing of the gradation that you propose to furnish for the specific sieve size under section 90-1.02C(4)(a).

Fine aggregate sizes must be distributed such that the difference between the total percentage passing the No. 16 and No. 30 sieves is from 10 to 40, and the difference between the percentage passing the No. 30 and No. 50 sieves is from 10 to 40.

You may separate fine aggregate into 2 or more sizes and store them separately, provided that the combined material complies with the gradation specifications.

90-1.02C(4)(d) Combined Aggregate Gradation

Use combined aggregate gradation limits only for the design of concrete mixes. Design concrete mixes such that aggregates are combined in proportions that produce a mixture within the gradation limits for combined aggregate.

Use either the 1-1/2-inch maximum gradation or the 1-inch maximum gradation, unless otherwise specified.

Combined aggregate must be graded within the limits shown in the following table:

Sieve size	1-1/2 inch max (% passing)	1 inch max (% passing)	1/2 inch max (% passing)	3/8 inch max (% passing)
2 inch	100	--	--	--
1-1/2 inch	90–100	100	--	--
1 inch	50–86	90–100	--	--
3/4 inch	45–75	55–100	100	--
1/2 inch	--	--	90–100	100
3/8 inch	38–55	45–75	55–86	50–100
No. 4	30–45	35–60	45–63	45–63
No. 8	23–38	27–45	35–49	35–49
No. 16	17–33	20–35	25–37	25–37
No. 30	10–22	12–25	15–25	15–25
No. 50	4–10	5–15	5–15	5–15
No. 100	1–6	1–8	1–8	1–8
No. 200	0–3	0–4	0–4	0–4

Do not change from one aggregate gradation to another during the progress of the work.

90-1.02D Water

Water for washing aggregates, mixing concrete, and curing must not contain:

1. Oil
2. Impurities at concentrations that cause either of the following results when compared to the same test using distilled or deionized water:
 - 2.1. Change of more than 25 percent in the setting time of cement when tested under ASTM C191 or ASTM C266
 - 2.2. Reduction by more than 5 percent in the mortar compressive strength at 14 days when tested under ASTM C109
3. Chlorides as Cl or sulfates as SO₄ in excess of the values shown in the following table:

Quality characteristic	Type of concrete work		
	Nonreinforced	Reinforced	PS
Chloride as Cl ^a (ppm, max)	2,000	1,000	650
Sulfate as SO ₄ ^b (ppm, max)	1,500	1,300	1,300

^aWhen tested under California Test 422

^bWhen tested under California Test 417

Water for curing concrete must not contain impurities at concentrations that cause discoloration or surface etching.

Water reclaimed from washing out the mixer may be used in mixing concrete. The water must not contain coloring agents or more than 300 ppm of alkalis as Na₂O + 0.658 K₂O as determined on the filtrate. The specific gravity of the water must not exceed 1.03 and must not vary more than ±0.010 during a day's activities.

90-1.02E Admixtures**90-1.02E(1) General**

The admixture type and brand must be on the Authorized Material List at the time of mix design submittal.

Admixtures must comply with the following:

1. Chemical admixtures must comply with ASTM C494
2. Air-entraining admixtures must comply with ASTM C260
3. Lithium nitrate must be in an aqueous solution that complies with the following:
 - 3.1. Lithium nitrate as LiNO_3 must be 30 ± 0.5 percent by weight
 - 3.2. Sulfate as SO_4 must be less than 1,000 ppm
 - 3.3. Chloride as Cl must be less than 1,000 ppm
 - 3.4. Alkalis as $\text{Na}_2\text{O} + 0.658 \text{ K}_2\text{O}$ must be less than 1,000 ppm

Chemical or air-entraining admixtures must not contain more than 1 percent chlorides as Cl by weight of admixture when tested under California Test 415.

Store and dispense the admixtures in liquid form.

Admixture properties must be uniform throughout their use in the work.

If more than 1 admixture is used, the admixtures must be compatible with each other such that the desirable effects of all the admixtures used are realized.

Use chemical admixtures in compliance with the manufacturer's written instructions. The instructions must include a statement that the admixture is compatible with the types and quantities of SCM used.

If you are ordered to use admixtures in the concrete that are not specified, furnishing the admixtures and adding them to the concrete is change order work.

90-1.02E(2) Chemical Admixtures

If the use of chemical admixtures is specified, use the dosage specified. If the dosage is not specified, use the dosage recommended by the admixture manufacturer.

You may use any of the following admixture types to conserve cementitious material or to facilitate construction:

1. Type A or F, water-reducing
2. Type B, retarding
3. Type D or G, water-reducing and retarding

If you use a water-reducing admixture or a water-reducing and retarding admixture, you may reduce the specified cementitious material content by up to 5 percent by weight. The resulting concrete must contain at least 505 pounds of cementitious material per cubic yard. If you reduce the cementitious material content, use at least the admixture dosage used in authorizing the admixture as shown on the Authorized Material List for chemical admixture for use in concrete.

You may use a Type S admixture.

You may use a Type C accelerating admixture. Inclusion of the Type C admixture in the mix design is not required if it is added to counteract changing conditions that contribute to delayed setting of the concrete and if the use or change in dosage of the admixture is authorized.

90-1.02E(3) Air-Entraining Admixtures

If air entrainment is specified or ordered, use the quantity of air-entraining admixture that produces concrete having the specified air content when tested under California Test 504.

If air entrainment is not specified or ordered, you may use an air-entraining admixture to facilitate the use of a construction procedure or equipment. The average air content of 3 successive tests must not exceed 4 percent and each test value must be no more than 5.5 percent when tested under California Test 504.

90-1.02F Proportioning Concrete**90-1.02F(1) General**

Reserved

90-1.02F(2) Storage of Aggregates

Store or stockpile aggregates such that the coarse and fine particles of each size do not separate and various sizes do not intermix before proportioning.

Prevent contamination by foreign materials while storing, stockpiling, and handling aggregates.

If you store the aggregates at a batching or mixing plant that is erected after the Contract is awarded and is used for furnishing concrete for the work:

1. Prevent intermingling of different aggregate sizes by using measures such as the physical separation of stockpiles or the construction of bulkheads of adequate length and height
2. Prevent contamination of the aggregates by contact with the ground through measures such as placing the aggregates on wooden platforms or on hardened surfaces made of concrete, asphalt concrete, or cement-treated material

When placing the aggregates in storage or moving the aggregates from storage to the weigh hopper of the batching plant, do not use methods that cause either of the following:

1. Segregation, degradation, or the combining of materials of different gradations and result in an aggregate size failing to comply with the gradation specifications at the weigh hopper
2. Excessive particle breakage

You may be required to use devices that reduce the impact of falling aggregates.

90-1.02F(3) Proportioning Devices

Automatic weighing systems must comply with section 90-1.02F(4)(c). For an automatic device, the single operation of a switch or starter must be the only manual operation required to proportion the aggregates, cement, and SCM for 1 batch of concrete.

Insulate the weighing equipment against the vibration or movement of other plant equipment.

The weight of each batch of material must not vary from the weight designated by the Engineer by more than the specified tolerances.

The weighing and measuring equipment must have the following zero tolerances:

1. For cumulative weighing of aggregates, ± 0.5 percent of the designated total aggregate batch weight
2. For weighing each aggregate size separately, ± 0.5 percent of the designated batch weight for each aggregate size
3. For cumulative weighing of cement and SCM, ± 0.5 percent of the designated total batch weight of the cement and SCM
4. For weighing cement and SCM separately, ± 0.5 percent of their designated individual batch weights
5. For measuring water, ± 0.5 percent of its designated weight or volume

The weight indicated for a batch of material must not vary from the preselected scale setting by more than the following:

1. Aggregates weighed cumulatively must be within ± 1.0 percent of the designated total aggregate batch weight.
2. Aggregates weighed separately must be within ± 1.5 percent of the designated batch weight of each aggregate.
3. Cement weighed separately must be within $+2$ to -1 percent of the designated cement batch weight.
4. SCM weighed separately must be within $+2$ to -1 percent of the designated SCM batch weight.
5. For cement and SCM weighed cumulatively, the cement must be within $+2$ to -1 percent of the designated cement batch weight and the total for cement and SCM must be within $+2$ to -1 percent of the sum of the designated cement and SCM batch weights.

6. Water must be within ± 1.5 percent of the designated weight or volume of water.

Each scale graduation must be no more than 0.001 of the total scale capacity. For each material being weighed, use a scale with single graduations that indicate a weight not exceeding the maximum permissible weight variation above, except that graduations less than 1 lb are not required.

90-1.02F(4) Proportioning

90-1.02F(4)(a) General

Proportioning consists of dividing the aggregates into the specified sizes, each stored in a separate bin, and combining the aggregates with cementitious material, admixtures if used, and water.

Proportion the aggregates by weight.

At the time of batching:

1. Aggregates must be dried and drained to a stable moisture content such that no visible separation of water from the aggregate occurs during transportation from the proportioning plant to the point of mixing
2. Free moisture content of the fine aggregate must not exceed 8 percent of its saturated surface-dry weight

If the proportioning plant has separate supplies of the same size group of aggregate with different moisture content, specific gravity, or surface characteristics affecting workability, exhaust one supply before using another supply.

Weigh bulk Type IP (MS) or Type IS (MS) cement in an individual hopper and keep it separate from the aggregates until the ingredients are released for discharge into the mixer.

Bulk cement and SCM may be weighed in separate weigh hoppers or in the same weigh hopper. Keep the cement and SCM separate from the aggregates until the ingredients are released for discharge into the mixer.

If the cement and SCM are weighed in the same weigh hopper, weigh the cement first. If the cement and SCM are weighed in separate weigh hoppers, the weigh systems for the proportioning of the aggregate, the cement, and the SCM must be individual and distinct from all other weigh systems. To constitute an individual and distinct material-weighing device, each weigh system must have a hopper, a lever system, and an indicator.

Discharge the cement and the SCM into the mixer simultaneously with the aggregate.

The scales and weigh hoppers for bulk weighing cement, SCM, or cement plus SCM must be separate and distinct from the aggregate weighing equipment.

For batches of 1 cu yd or more, the batching equipment must comply with one of the following combinations:

1. Separate boxes and separate scale and indicator for weighing each aggregate size
2. Single box and scale indicator for all aggregates
3. Single box or separate boxes and automatic weighing mechanism for all aggregates

If you are requested to check the accuracy of batch weights, determine the gross weight and tare weight of batch trucks, truck mixers, truck agitators, and nonagitating hauling equipment. Weigh the equipment using scales designated by the Engineer.

For proportioning pavement concrete, install and maintain in good operating condition an electronically actuated moisture meter that indicates, on a readily visible scale, changes in the moisture content of the fine aggregate as it is batched within a sensitivity of 0.5 percent by weight of the fine aggregate.

90-1.02F(4)(b) Proportioning and Dispensing Liquid Admixtures

Liquid admixture dispensers must:

1. Have enough capacity to measure at 1 time the total quantity of admixture required for each batch of concrete
2. Include a graduated measuring unit that is accurate to within ± 5 percent of the required quantity for each batch of concrete
3. Be located and maintained such that the graduations can be read accurately from the point at which proportioning is controlled to allow a visual check of batching accuracy before discharge
4. Have measuring units that are clearly marked for the type and quantity of admixture

Each liquid admixture dispensing system must be equipped with a sampling device that consists of a valve located in a safe and readily accessible position such that the Engineer can slowly withdraw a test sample.

If more than 1 liquid admixture is used in the concrete mix, each admixture must have a separate measuring unit and must be dispensed by injecting equipment located such that the admixtures are not mixed at high concentrations and do not interfere with the effectiveness of each other.

If an air-entraining admixture is used with other liquid admixtures, incorporate the air-entraining admixture into the mix first, unless you demonstrate that a different sequence improves performance.

If automatic proportioning devices are used, the liquid admixture dispensers must operate automatically with the batching control equipment. The dispensers must have an automatic warning system in good operating condition that provides a visible or audible signal at the point at which proportioning is controlled. The signal must activate if the quantity of admixture measured varies from the preselected dosage by more than 5 percent or if the entire contents of the measuring unit are not emptied from the dispenser.

Add liquid admixtures to the premeasured batch water or discharge the admixtures into the stream of water such that they are well-dispersed throughout the batch.

You may dispense air-entraining admixtures directly into moist sand in the batching bins if you maintain adequate control of the concrete air content.

90-1.02F(4)(c) Automatic Proportioning

Automatic proportioning devices must be authorized by the Agency.

The batching of the aggregate and the cement, SCM, or cement plus SCM must be interlocked such that a new batch cannot start until all weigh hoppers are empty, the proportioning devices are within zero tolerance, and the discharge gates are closed.

The interlock must not allow any part of the batch to be discharged until all aggregate hoppers and the cement and SCM hoppers or the cement plus SCM hopper are charged with weights that are within the tolerances specified in section 90-1.02F(3).

If interlocks are required for the cement and SCM charging mechanisms and the cement and SCM are weighed cumulatively, their charging mechanisms must be interlocked to prevent the introduction of SCM until the weight of cement in the cement weigh hopper is within the tolerances specified in section 90-1.02F(3).

If the concrete is mixed completely in a stationary mixer, weigh the SCM in a separate weigh hopper and introduce the SCM and cement simultaneously into the mixer proportionately with the aggregate. If you submit certification that the stationary mixer is capable of mixing the cement, SCM, aggregates, and water uniformly before discharge, you may weigh the SCM cumulatively with the cement. Certification must include:

1. Test results for 2 compressive strength test cylinders taken within the first 1/3, and 2 compressive strength test cylinders taken within the last 1/3, of a single batch of concrete discharged from the stationary mixer. Strength tests and cylinder preparation must comply with section 90-1.01D(5).
2. Calculations demonstrating that the average of the 2 compressive strengths taken within the first 1/3 of the batch do not differ by more than 7.5 percent from the average of the 2 compressive strengths taken within the last 1/3 of the batch.

3. Mixer rotation speed and time of mixing before discharge that are required to produce a mix that complies with the above requirements.

The discharge gate on the cement and SCM hoppers or the cement plus SCM hopper must be designed to allow the regulation of the flow of cement, SCM, or cement plus SCM into the aggregate.

If separate weigh boxes are used for each aggregate size, the discharge gates must allow the regulation of the flow of each aggregate size.

Material discharged from each bin must be controlled by gates or by mechanical conveyors.

The means of withdrawal from the bins and of discharge from the weigh box must be interlocked such that not more than 1 bin can discharge at a time and the weigh box cannot be tripped until the required quantity from each bin has been deposited into it.

If a separate weigh box is used for each aggregate size, all the weigh boxes may be operated and discharged simultaneously.

If the discharge from the bins is controlled by gates, each gate must be actuated automatically such that the required weight is discharged into the weigh box, after which the gate must automatically close and lock.

The automatic weighing system must be designed to allow all required proportions to be set on the weighing controller at the same time.

90-1.02G Mixing and Transporting Concrete

90-1.02G(1) General

Mix the concrete in a mechanically operated mixer, except, if authorized, you may mix batches not exceeding 1/3 cu yd by hand methods under section 90-1.02G(5).

Do not use equipment with components made of aluminum or magnesium alloys that could have contact with plastic concrete during mixing, transporting, or pumping.

Concrete must be thoroughly mixed, homogeneous, and free of lumps or evidence of undispersed cementitious material.

90-1.02G(2) Machine Mixing

Concrete mixers must be the revolving drum or revolving blade type. Operate the mixing drum or blades uniformly at the mixing speed recommended by the manufacturer. Do not use a mixer or agitator that has an accumulation of hard concrete or mortar.

Immediately before placing the concrete, the temperature of the mixed concrete must be from 50 to 90 degrees F. Cool or heat the aggregates and mixing water as necessary to produce concrete within these temperature limits. Do not heat the aggregates or water above 150 degrees F. Any ice used to cool the concrete must be melted before the concrete is discharged from the mixer.

Charge the batch into the mixer such that some water enters before the cementitious materials and aggregates. Add all the water to the drum by the end of the first 1/4 of the specified mixing time. If the concrete is delivered in a truck mixer, you may withhold a portion of the mixing water and, if authorized, add it at the delivery point as specified in section 90-1.02G(3).

Batch and charge the cementitious materials into the mixer by means that will not cause:

1. Loss of cementitious materials due to the effect of wind
2. Accumulation of cementitious materials on the surfaces of conveyors or hoppers
3. Other conditions that reduce or vary the required quantity of cementitious material in the concrete mixture

Operate stationary mixers with an automatic timing device. The timing device and discharge mechanism must be interlocked such that during normal operation no part of the batch is discharged before the specified mixing time has elapsed.

The total time from the intermingling of damp aggregates and all cementitious materials to the start of mixing must not exceed 30 minutes.

The batch size must not exceed the manufacturer's guaranteed capacity.

For pavement or base concrete, install and maintain suitable batch counters in good operating condition at job site batching plants and stationary mixers. The batch counters must indicate the exact number of batches proportioned and mixed.

Mix and deliver the concrete to the job site by one of the following methods:

1. Central-mixed concrete, in which the concrete is mixed completely in a stationary mixer and transported to the delivery point in a truck agitator or nonagitating hauling equipment.
2. Shrink-mixed concrete, in which the concrete is mixed partially in a stationary mixer and the mixing is completed in a truck mixer.
3. Transit-mixed concrete, in which the concrete is mixed completely in a truck mixer.

Agitators must be truck mixers operating at agitation speed or truck agitators. Each mixer and agitator must have a metal plate attached in a prominent place that clearly shows:

1. Various uses for which the equipment is designed
2. Manufacturer's guaranteed drum or container capacity in terms of the volume of mixed concrete
3. Rotation speed of the mixing drum or blades

Truck mixers must have an electrically or mechanically actuated revolution counter that readily allows verification of the number of revolutions of the drum or blades.

For shrink-mixed concrete, transfer concrete that has been partially mixed at a central plant into a truck mixer and comply with the specifications for transit-mixed concrete. Partial mixing in a central plant does not count toward the number of revolutions at mixing speed.

90-1.02G(3) Transporting Mixed Concrete

You must transport mixed concrete to the delivery point in one of the following:

1. Truck agitator operating at the manufacturer's designated agitating speed if it:
 - 1.1. Does not carry more than the manufacturer's guaranteed capacity
 - 1.2. Maintains the mixed concrete in a thoroughly mixed and uniform mass during hauling
2. Truck mixer operating at the manufacturer's designated agitating speed
3. Nonagitating hauling equipment with a body that does not allow leakage of any part of the concrete mix at any time

When discharged at the delivery point, the consistency and workability of the mixed concrete must be suitable for adequate placement and consolidation in place and the mixed concrete must comply with the specifications for uniformity in section 90-1.02A.

Protect concrete hauled in open-top vehicles from rain or from exposure to the sun for more than 20 minutes if the ambient temperature exceeds 75 degrees F.

Do not add water to the concrete in excess of that in the authorized mix design. At the delivery point, you may add water withheld during batching if authorized. Add the water in 1 operation before the discharge of more than 1/4 cu yd. The equipment for supplying the water must comply with section 90-1.02G(6). After adding the water, revolve the drum at least 30 revolutions at mixing speed before discharging the concrete.

Control the rate of discharge of mixed concrete from a truck mixer or agitator by the speed of rotation of the drum in the discharge direction with the discharge gate fully open.

If you use a truck mixer or agitator to transport the concrete to the delivery point, comply with the following limits:

1. Complete the discharge within 1.5 hours or before 250 revolutions of the drum or blades, whichever occurs first, after introducing the cementitious materials to the aggregates.
2. Under conditions contributing to quick stiffening of the concrete, or if the concrete temperature is 85 degrees F or above, the time allowed may be less than 1.5 hours.
3. If you use an admixture to retard the set time:
 - 3.1. Concrete temperature must not exceed 85 degrees F
 - 3.2. Time limit is 2 hours
 - 3.3. Revolution limit is 300

If you use nonagitating hauling equipment to transport the concrete to the delivery point:

1. Complete the discharge within 1 hour after introducing the cementitious materials to the aggregates
2. Under conditions contributing to quick stiffening of the concrete, or if the concrete temperature is 85 degrees F or above, complete the discharge within 45 minutes after introducing the cementitious materials to the aggregates

If you add a high-range water-reducing admixture to the concrete at the job site, the total number of revolutions must not exceed 300.

90-1.02G(4) Time or Quantity of Mixing

Mixing of the concrete in a stationary mixer must continue for the required mixing time after all ingredients, except water and admixture that is added with the water, are in the mixing compartment of the mixer before any part of the batch is released. The transfer time in multiple drum mixers must not be counted as part of the required mixing time.

For concrete used in concrete structures other than minor structures, the mixing time in a stationary mixer must be at least 90 seconds and no more than 5 minutes, except that if authorized the minimum mixing time may be reduced to 50 seconds. For all other concrete, the mixing time must be at least 50 seconds and no more than 5 minutes.

The minimum required revolutions at the mixing speed for transit-mixed concrete must be at least that recommended by the mixer manufacturer and must be enough to produce uniform concrete under section 90-1.02A.

90-1.02G(5) Hand Mixing

Hand-mixed concrete must be made in batches of 1/3 cu yd or less.

Use the following procedure to make hand-mixed concrete:

1. Measure the quantity of coarse aggregate in measuring boxes.
2. Spread the coarse aggregate on a watertight, level platform.
3. Spread the fine aggregate on the layer of coarse aggregate. The total depth of the 2 layers must be 1 foot or less.
4. Spread the dry cementitious materials on the aggregates.
5. Turn the whole dry mass at least 2 times.
6. Add and evenly distribute the water.
7. Turn the whole mass at least 3 more times, not including placement in the carriers or forms.

90-1.02G(6) Quantity of Water and Penetration or Slump

Regulate the quantity of water used in the concrete mix such that the penetration as tested under California Test 533, or the slump as tested under ASTM C143, complies with the nominal range shown in the following table:

Type of work	Nominal		Maximum	
	Penetration (in)	Slump (in)	Penetration (in)	Slump (in)
Concrete pavement	0–1	--	1.5	--
Nonreinforced concrete members	0–1.5	--	2	--
Reinforced concrete structures with:				
Sections over 12 inches thick	0–1.5	--	2.5	--
Sections 12 inches thick or less	0–2	--	3	--
Concrete placed under water	--	6–8	--	9
CIP concrete piles	2.5–3.5	5–7	4	8

If the penetration or slump exceeds the nominal range, adjust the mixture for subsequent batches to reduce the penetration or slump to a value within the nominal range.

Do not use a batch of concrete with a penetration or a slump that exceeds the maximum value shown in the table above.

If Type F or G chemical admixtures are used, the penetration requirements do not apply and the slump must not exceed 9 inches after adding the chemical admixtures.

The quantity of free water must not exceed 310 pounds per cubic yard of concrete plus 20 pounds of free water for each required 100 pounds of cementitious material in excess of 550 pounds of cementitious material per cubic yard of concrete.

When determining the total quantity of free water, consider liquid admixtures to be water if the dosage is more than 1/2 gallon of admixture per cubic yard of concrete.

If there are adverse or difficult conditions that affect concrete placement, you may exceed the specified penetration and free water content limitations if you:

1. Receive authorization to increase the cementitious material content per cubic yard of concrete
2. Increase the water and cementitious material at a ratio that does not exceed 30 pounds of water per added 100 pounds of cementitious material per cubic yard of concrete

The equipment for supplying water to the mixer must accurately measure to within 1.5 percent of the quantity of water required to be added to the mix for any position of the mixer.

The tanks used to measure the water must be designed such that water cannot enter while water is being discharged into the mixer. The water must be discharged into the mixer rapidly in 1 operation without dribbling.

Arrange the equipment to allow checking of the quantity of water delivered by discharging into measured containers.

90-1.02H Concrete in Corrosive Environments

Section 90-1.02H applies to concrete ~~shown specified in the special provisions~~ to be in a corrosive environment.

The cementitious material to be used in the concrete must be a combination of Type II or V portland cement and SCM.

The concrete must contain at least 675 pounds of cementitious material per cubic yard.

The reduction of cementitious material content as specified in section 90-1.02E(2) is not allowed.

The specifications for SCM content in section 90-1.02B(3) do not apply.

For pavement, the total cementitious material must be composed of one of the following options, by weight:

1. 25 percent natural pozzolan or fly ash with a CaO content of up to 10 percent and 75 percent portland cement
2. 20 percent natural pozzolan or fly ash with a CaO content of up to 10 percent, 5 percent silica fume, and 75 percent portland cement
3. 12 percent silica fume, metakaolin, or UFFA, and 88 percent portland cement
4. 50 percent GGBFS and 50 percent portland cement

For structures, the total cementitious material must be composed of one of the following options, by weight:

1. 25 percent natural pozzolan or fly ash with a CaO content of up to 10 percent and 75 percent portland cement.
2. 20 percent natural pozzolan or fly ash with a CaO content of up to 10 percent, 5 percent silica fume, and 75 percent portland cement.
3. 12 percent silica fume, metakaolin, or UFFA, and 88 percent portland cement.
4. 50 percent GGBFS and 50 percent portland cement.
5. 25 to 50 percent fly ash with a CaO content of up to 10 percent, and no natural pozzolan. The remaining portion of the cementitious material must be portland cement or a combination of portland cement and UFFA, metakaolin, GGBFS, or silica fume.

90-1.02I Concrete in Freeze-Thaw Areas

Not Used

90-1.02J Curing Compound

Curing compound water loss must not exceed 0.15 kg/m² in 24 hours when tested under California Test 534.

90-1.03 CONSTRUCTION

90-1.03A General

Reserved

90-1.03B Curing Concrete

90-1.03B(1) General

Unless otherwise specified, cure newly placed concrete by one of the method specified in this section.

Cure mortar and grout by keeping the surface damp for 3 days.

90-1.03B(2) Water Method

The water method must consist of keeping the concrete continuously wet by applying water for a curing period of at least 7 days after the concrete is placed.

Keep the concrete surface wet by applying water with an atomizing nozzle that forms a mist until the surface is covered with curing media. Do not allow the water to flow over or wash the concrete surface. At the end of the curing period, remove curing media.

Use any of the following curing media to retain moisture:

1. Mats, rugs, or carpets
2. Earth or sand blankets
3. Sheeting materials complying with the durability and water vapor transmission rate specified in section 5 of ASTM C171

To ensure proper coverage during curing:

1. Cover the entire concrete surface with the curing media
2. Secure the curing media joints to retain moisture
3. Keep the curing media within 3 inches of the concrete at all points along the surface being cured

Monitor concrete surface temperature during curing. Ensure that surface temperature is maintained at 140 degrees F or below. If the surface temperature exceeds 140 degrees F, determine cause and provide alternative curing methods to the Engineer for authorization.

90-1.03B(3) Curing Compound Method

90-1.03B(3)(a) General

The curing compound method must consist of uniformly spraying the concrete surfaces exposed to the air with a curing compound.

90-1.03B(3)(b) Materials

The curing compound must comply with the requirements shown in the following table for the curing compound number specified:

Curing compound no.	ASTM C309 classification
1	Pigmented, Type 2, Class B ^a
2	Pigmented, Type 2, Class B
3	Pigmented, Type 2, Class A
4	Nonpigmented, Type 1, Class B
5	Nonpigmented, Type 1, Class A
6	Nonpigmented with fugitive dye, Type 1-D, Class A

^aThe resin type must be poly-alpha-methylstyrene. The infrared scan for the dried vehicle must match the scan on file at METS.

If no curing compound number is specified, use any of the curing compounds shown in the table above.

The curing compound must be manufactured to:

1. Remain sprayable at temperatures above 40 degrees F
2. Control sagging, pigment settling, leveling, and de-emulsification
3. Maintain the specified properties for at least 1 year

Pigmented curing compounds must be manufactured such that the pigment does not settle badly, cake or thicken in the container, or become granular or curdled.

Settlement of pigment must be a thoroughly wetted, soft, mushy mass allowing the complete and easy vertical penetration of a paddle. Settled pigment must be easily predisposed, with minimum resistance to the sideways manual motion of the paddle across the bottom of the container, to form a smooth, uniform product of the proper consistency.

Do not dilute or alter the curing compound after manufacture.

The curing compound must be packaged in clean 274-gallon totes, 55-gallon barrels, or 5-gallon pails, or must be supplied from a suitable storage tank located at the job site or casting site. The containers must comply with 49 CFR 171–180. The 274-gallon totes and 55-gallon barrels must have removable lids and airtight fasteners. The 5-gallon pails must be round and have standard full open head and bail. Do not use lids with bungholes.

Containers must be filled in a way that prevents skinning.

Steel containers and lids must be lined with a coating that prevents destructive action by the compound or chemical agents in the air space above the compound. The coating must not come off the container or lid as skins.

Plastic containers and lids must not react with the curing compound.

Label each curing compound container with:

1. Manufacturer's name
2. ASTM C309 classification

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3. Batch number
4. Volume
5. Date of manufacture
6. Volatile organic compound content
7. Warning that curing compound containing pigment must be well stirred before using
8. Precautions concerning the handling and application of curing compound in compliance with 8 CA Code of Regs §§ 1500–1938 and 3200–6184
9. Statement that the contents fully comply with State air pollution control rules and regulations

90-1.03B(3)(c) Mixing

Before using a curing compound, completely redisperse settled or separated solids in containers, except tanks, by mixing at low speed in compliance with these specifications and the manufacturer's instructions. Mix manually using a paddle or mix using a mixing blade driven by a drill motor at low speed. Mixing blades must be the type used for mixing paint.

Keep on-site storage tanks clean and free of contaminants. Each tank must have a permanent system that completely redisperses settled material without introducing air or other foreign substances.

At the time of use, compounds containing pigments must be thoroughly mixed. Use a paddle to loosen all settled pigment from the container bottom and use a power-driven agitator to disperse the pigment uniformly throughout the vehicle.

Agitation must not introduce air or other foreign substances into the curing compound.

90-1.03B(3)(d) Application

Apply the curing compound at a nominal rate of 150 sq ft/gal.

At any point, the application rate must be within ± 50 sq ft/gal of the nominal rate. The average application rate must be within ± 25 sq ft/gal of the nominal rate when tested under California Test 535. Apply the curing compound such that there are no runs, sags, thin areas, skips, or holidays.

Apply the curing compound using power-operated spraying equipment with an operational pressure gauge and a means of controlling the pressure. The Engineer may allow hand spraying for small and irregular areas that, in the Engineer's opinion, are not reasonably accessible to power-operated spraying equipment.

Apply the curing compound to the concrete after finishing the surface, immediately before the moisture sheen disappears from the concrete surface but before drying shrinkage or craze cracks start to appear.

If the concrete surface cracks or dries, immediately and continually apply water with an atomizing nozzle as specified in section 90-1.03B(2) until application of the curing compound is resumed or started. Do not apply the curing compound over freestanding water.

If the film of curing compound is damaged before the expiration of 7 days after the concrete is placed for structures and 72 hours for pavement, immediately repair it with additional compound.

90-1.03B(4) Waterproof Membrane Method

The waterproof membrane method must consist of:

1. Spraying the exposed finished concrete surfaces with water, using an atomizing nozzle that forms a mist and not a spray, until the concrete has set
2. Placing the waterproof curing membrane immediately after spraying
3. Keeping the membrane in place for at least 72 hours

The membrane must be sheeting material that complies with ASTM C171 for white reflective materials.

Use sheeting material of such a width as to completely cover the entire concrete surface. Cement the sheeting joints together securely such that the joints are waterproof. The joint seams must have at least a 4-inch lap.

Securely weigh down the sheets by placing an earth bank on the sheet edges or by other authorized means.

If any portion of the sheets are damaged within 72 hours after being placed, immediately repair the damaged portion by cementing new sheets into place.

Do not use a membrane that is no longer waterproof or has been damaged such that it is unfit for curing concrete.

90-1.03B(5) Forms-In-Place Method

The forms-in-place method must consist of curing formed concrete surfaces by keeping the forms in place.

Keep the forms in place for at least 7 days after the concrete is placed, except keep the forms in place for at least 5 days for concrete members over 20 inches in least dimension.

The joints in the forms and the joints between the end of the forms and the concrete must be kept moisture tight during the curing period. Reseal cracks in the forms and cracks between the forms and the concrete using authorized methods.

90-1.03C Protecting Concrete

Protect the concrete from damage due to any cause, including rain, heat, cold, wind, your actions, and the actions of others.

Do not place the concrete on frozen or ice-coated ground or subgrade or on ice-coated forms, reinforcing steel, structural steel, conduits, PC members, or construction joints.

If it is raining, you must provide adequate protection against damage or you must stop placing the concrete before the quantity of surface water is sufficient to damage the surface mortar or cause a flow or wash of the concrete surface.

90-1.04 PAYMENT

Not Used

90-2 MINOR CONCRETE

90-2.01 GENERAL

90-2.01A Summary

Section 90-2 includes specifications for furnishing and protecting minor concrete.

90-2.01B Definitions

Reserved

90-2.01C Submittals

If required by the following table, submit compressive strength test results with the mix design that verify the minimum required compressive strength:

SCM	Test submittal required
Fly ash used alone	If portland cement content < 350 lb/cu yd
GGBFS used alone	If portland cement content < 250 lb/cu yd
Natural pozzolan used alone	If portland cement content < 350 lb/cu yd
More than 1 SCM	Always

NOTE: Compressive strength tests must be performed by an ACI-certified technician.

Submit the concrete mix design before using the concrete in the work and before changing the mix proportions.

Submit a proposed combined aggregate gradation. After authorization of the gradation, the aggregate furnished for minor concrete must comply with that gradation.

If requested, submit periodic test reports of the aggregate gradation furnished.

The Engineer may waive the specifications for gradation if the Engineer determines that furnishing a gradation is not necessary for the type or quantity of concrete work to be constructed.

Before placing minor concrete from a source not previously used on the Contract, submit a certificate of compliance stating that the minor concrete to be furnished complies with the Contract requirements, including the specified minimum cementitious material content.

Submit a weighmaster certificate as an informational submittal with each load of ready-mixed concrete at the concrete discharge location. The weighmaster certificate must show the date and time the load left the batching plant and, if hauled in a truck mixer or agitator, the time the mixing cycle started.

90-2.01D Quality Assurance

~~Section 90-1.01D(5) and the~~ The specifications for uniformity in section 90-1.02A do not apply to minor concrete. Pregualify mix under section 90-1.01D(5). Minor concrete must attain a minimum 28-day compressive strength of 3600-psi.

The Engineer may perform tests and inspect the facilities, materials, and methods for producing the minor concrete to ensure that it is of suitable quality for use in the work.

The Engineer verifies compliance with the specified cementitious material content by testing under California Test 518 for cement content. For testing purposes, SCM is considered to be cement. Adjust the batch proportions as necessary to produce concrete having the specified cementitious material content.

90-2.02 MATERIALS

90-2.02A General

Reserved

90-2.02B Cementitious Material

Minor concrete must contain at least 505 pounds of cementitious material per cubic yard.

You may use rice hull ash as an SCM. Rice hull ash must comply with AASHTO M 321 and the requirements for the quality characteristics shown in the following tables:

Chemical quality characteristic	Requirement (percent)
Silicon dioxide (SiO ₂) ^a (min)	90
Loss on ignition (max)	5.0
Total alkalis as Na ₂ O equivalent (max)	3.0

^aSiO₂ in crystalline form must not exceed 1.0 percent.

Physical quality characteristic	Requirement
Particle size distribution	
Less than 45 microns (min, %)	95
Less than 10 microns (min, %)	50
Strength activity index with portland cement ^a	
7 days (min, % of control)	95
28 days (min, % of control)	110
Expansion at 16 days when testing project materials under ASTM C1567 ^b (max, %)	0.10
Surface area when testing by nitrogen adsorption under ASTM D5604 (min, m ² /g)	40.0

^aWhen tested under AASHTO M 307 for strength activity testing of silica fume.

^bIn the test mix, Type II or V portland cement must be replaced with at least 12 percent rice hull ash by weight.

For the purpose of calculating the equations for the cementitious material specifications, consider rice hull ash to be represented by the variable *UF*.

90-2.02C Aggregate

Sections 90-1.01C(2) and 90-1.02C do not apply to minor concrete.

The aggregate must be clean and free from deleterious coatings, clay balls, roots, and other extraneous material.

The maximum aggregate size must not be larger than 1-1/2 inches or smaller than 3/4 inch.

You may not use crushed concrete and reclaimed aggregate ~~if they comply with the specifications for aggregate.~~

90-2.02D Water

Section 90-1.02D does not apply to minor concrete.

Water used for washing, mixing, and curing must be free from oil, salts, and other impurities that would discolor or etch the surface or have an adverse affect on the concrete quality.

90-2.02E Production

Sections 90-1.02F, 90-1.02G(1), 90-1.02G(2), 90-1.02G(3), and 90-1.02G(4) do not apply to minor concrete.

Store, proportion, mix, transport, and discharge the cementitious material, water, aggregate, and admixtures in compliance with recognized standards of good practice that result in thoroughly and uniformly mixed concrete suitable for the intended use. Recognized standards of good practice are outlined in various industry publications, such as those issued by ACI, AASHTO, or Caltrans.

Use a quantity of water that produces concrete with a consistency that complies with section 90-1.02G(6). Do not add water during hauling or after arrival at the delivery point unless allowed by the Engineer.

Discharge ready-mixed concrete from the transport vehicle while the concrete is still plastic and before stiffening occurs. Take whatever action is necessary to eliminate quick stiffening, except do not add water.

Conditions contributing to quick stiffening are:

1. Elapsed time of 1.5 hours in agitating hauling equipment or 1 hour in nonagitating hauling equipment
2. More than 250 revolutions of the drum or blades after introduction of the cementitious material to the aggregates
3. Concrete temperature over 90 degrees F

The mixing time in a stationary mixer must be at least 50 seconds and no more than 5 minutes.

The minimum required revolutions at mixing speed for transit-mixed concrete must be at least that recommended by the mixer manufacturer and must be increased as needed to produce thoroughly and uniformly mixed concrete.

If you add a high-range water-reducing admixture to the concrete at the job site, the total revolutions must not exceed 300.

90-2.03 CONSTRUCTION

Maintain a concrete temperature of at least 40 degrees F for 72 hours after placing.

90-2.04 PAYMENT

Not Used

90-3 RAPID STRENGTH CONCRETE

Not Used

90-4 PRECAST CONCRETE**90-4.01 GENERAL****90-4.01A Summary**

Section 90-4 includes specifications for furnishing and curing PC concrete members.

The specifications for (1) shrinkage in section 90-1.02A, (2) shrinkage reducing chemical admixture in section 51-1.02B, and (3) polymer fibers in section 51-1.02B do not apply to PC concrete members.

90-4.01B Definitions

Reserved

90-4.01C Submittals**90-4.01C(1) General**

For reports and logs, type or clearly print the name next to the signature of the person signing the report or log.

Submit expansion test data under section 90-4.02, if required.

Submit daily temperature data for internally monitored tier 1 PC concrete members each week as an informational submittal.

Submit your QC test results for the tests performed under section 90-4.01D as an informational submittal. The QC test results must be submitted ~~electronically through the Data Interchange for Materials Engineering website~~ within 3 business days of completion of each QC test and must include the concrete mix design number.

90-4.01C(2) Certificates of Compliance

Submit a certificate of compliance for the cementitious material used in PC concrete members. The certificate must be signed by the PC concrete product manufacturer.

Submit a certificate of compliance for each PC concrete member. The certificate of compliance for tier 1 and tier 2 members must be signed by the QC manager. The certificate of compliance for tier 3 members must be signed by the QC Inspector.

90-4.01C(3) Precast Concrete Quality Control Plan

Before performing any precasting activities for tier 1 and tier 2 PC concrete members, submit 3 copies of the project-specific QC plan for the PC plant. The QC plan must supplement the information from the authorized facility audit. Submit a separate QC plan for each plant. Allow 25 days for review.

Each project-specific QC plan must include:

1. Name of the precasting plant, concrete plants, and any testing laboratory to be used.
2. Manual prepared by the precasting plant that includes:
 - 2.1. Equipment description
 - 2.2. Testing procedures
 - 2.3. Safety plan
 - 2.4. Personnel names, qualifications, and copies of certifications
3. QC manager and QC inspector names, qualifications, and copies of certifications.
4. Organizational chart showing QC personnel and their assigned QC responsibilities.
5. Methods and frequencies for performing QC procedures including inspections, material testing, and any survey performed for all components of PC concrete members. Components include prestressing, concrete, grout, reinforcement, steel, miscellaneous metal, and formwork.
6. System for reporting noncompliant PC concrete members to the Engineer.
7. System for identification and tracking repairs and repair methods.
8. Procedure for the reinspection of repaired PC concrete members.
9. Forms for certificates of compliance, daily production logs, and daily reports.

For internally monitored tier 1 PC bridge components, include the following as part of the QC plan:

1. Authorized mix design
2. Duration and method of curing
3. Concrete temperature monitoring and recording system details
4. Temperature sensor types and locations
5. Measures to ensure compliance with maximum temperature and temperature gain requirements, including maximum concrete temperature at discharge and controlling enclosure temperature

Submit a revised QC plan for any changes to:

1. Concrete plants
2. Material sources
3. Material testing procedures
4. Testing laboratory
5. Procedures and equipment
6. Systems for tracking and identifying PC concrete members
7. QC personnel
8. Methods for controlling internal concrete temperature

After authorization, submit 7 copies of each authorized QC plan and make 1 copy available at each location where work is performed.

Allow 7 days for review of a revised QC plan.

90-4.01C(4) Daily Production Log

The QC inspector must provide reports to the QC manager for each day that precasting activities are performed.

The QC manager must maintain a daily production log of PC activities for each day's precasting. PC activities include setting forms, placing reinforcement, setting prestressing steel, casting, curing, post tensioning, and form release. This daily log must be available at the precasting plant. The daily log must include:

1. Plant location
2. Specific description of casting or related activities
3. Any problems or deficiencies discovered
4. Any testing or repair work performed
5. Names of QC inspectors and the specific QC inspections they performed that day
6. Reports for that day's precasting activities from each QC inspector including before, during, and after precast inspections
7. Daily temperature data for internally monitored tier 1 PC concrete members

Immediately notify the Engineer when any precasting problems or deficiencies are discovered, and submit the proposed repair or process changes necessary to correct them.

90-4.01C(5) Precast Concrete Report

Before shipping PC concrete members, submit a PC concrete report. The report must include:

1. Reports of all material tests and any survey checks
2. Documentation that:
 - 2.1. You have evaluated all tests
 - 2.2. You corrected all rejected deficiencies
 - 2.3. Repairs have been reexamined with the required tests and found acceptable
3. Daily production logs
4. Certificates of compliance
5. Documentation of inspections

Each person who performs a material test or survey check must sign the corresponding report and submit the report directly to the QC manager.

90-4.01D Quality Assurance**90-4.01D(1) General**

Quality assurance for PC concrete includes:

1. Your QC program
2. Agency's acceptance of PC concrete members

PC concrete members are categorized into the following 4 tiers:

1. Tier 1 consists of:
 - 1.1. Components of bridge structures, including girders, deck panels, bent caps, abutments, slabs, closure wall panels, and piling
 - 1.2. Prestressed pavement
2. Tier 2 consists of:
 - 2.1. Components of earth retaining systems
 - 2.2. Wingwalls
 - 2.3. Types A, B, and C pipe culvert headwalls, endwalls, and wingwalls
 - 2.4. Pavement
 - 2.5. Box culverts
 - 2.6. Sound wall panels and supports
3. Tier 3 consists of:
 - 3.1. Pipes
 - 3.2. Pipe drainage facilities
 - 3.3. Straight and "L" pipe culvert headwalls except those listed under tier 2
 - 3.4. Drainage Inlets
 - 3.5. Flared end sections
4. Tier 4 consists of any member not described as tier 1, tier 2, or tier 3

90-4.01D(2) Quality Control**90-4.01D(2)(a) General**

For tier 1 and tier 2 PC concrete members:

1. Fabricate PC concrete members at a plant on the Authorized Facility Audit List
2. Assign a PC concrete QC manager to the plant
3. Assign a QC inspector who is either registered as a civil engineer in the State or:
 - 3.1. For tier 1, has a Plant Quality Personnel Level II certification from the Precast/Prestressed Concrete Institute
 - 3.2. For tier 2, has a Plant Quality Personnel Level I certification from the Precast/Prestressed Concrete Institute
4. Prepare a PC concrete QC plan
5. Perform PC concrete materials testing
6. Maintain a daily production log
7. Prepare a PC concrete report
8. Prepare a certificate of compliance

For tier 3 PC concrete members:

1. Assign a QC inspector who has one of the following qualifications:
 - 1.1. Registration as a civil engineer in the State.
 - 1.2. Plant Quality Personnel, Level I certification from the Precast/Prestressed Concrete Institute.
 - 1.3. Competency to perform inspection of PC operations. An inspector is competent if the individual has completed training or has experience in PC operations and inspection.
2. Prepare a certificate of compliance

For tier 4 PC concrete members, prepare a certificate of compliance.

For each ASTM test method specified in this section, the material's test result must comply with the requirement specified for the comparable test elsewhere in section 90 unless otherwise specified.

If curing compound is used, provide certificate of compliance as specified in section 90-1.01C(5).

If PC concrete is manufactured at an established PC concrete plant, a trial batch and prequalification of the materials, mix proportions, mixing equipment, and procedures under section 90-1.01D(5)(b) are not required.

90-4.01D(2)(b) Quality Control Meeting

After submitting the PC concrete QC plan, hold a meeting to discuss the requirements for PC concrete QC. The meeting attendees must include the Engineer, the PC concrete QC manager, and a representative from each plant performing PC concrete activities for the Contract.

90-4.01D(2)(c) Sampling, Testing, and Inspecting

The QC laboratory testing personnel or the QC inspector must witness sampling. The QC laboratory testing personnel must perform testing.

QC laboratory testing personnel must have the following certifications, as applicable:

1. ACI Strength Testing Technician
2. ACI Concrete Laboratory Testing Technician Level 1
3. ACI Aggregate Testing Technician Level 2

The QC Inspector must perform inspections before, during, and after casting is complete.

QC field testing and inspection personnel must have an ACI Concrete Field Testing Technician, Grade I certification.

For each mix design used for tier 1 and tier 2 PC concrete members, perform sampling and testing at the minimum frequencies shown in the following tables:

Aggregate QC Tests

Quality characteristic	Test method	Minimum testing frequency
Aggregate gradation	ASTM C136	Once per 400 cu yd of concrete cast or every 7 days, whichever is more frequent
Sand equivalent	ASTM D2419	
Percent fines under 75 microns ^a	ASTM C117	
Moisture content of fine aggregate	ASTM C566, or electronically actuated moisture meter ^b	1–2 times per each day of pour, depending on conditions

^aPercent fines under 75 microns test replaces the cleanness test in section 90-1.02C with the requirements of 1.5 percent maximum for "Operating Range" and 2.0 percent maximum for "Contract Compliance." The 5th paragraph of section 90-1.02C(2) does not apply.

^bElectronically actuated moisture meter must be calibrated every 7 days per ASTM C566.

Concrete QC Tests

Quality characteristic	Test method	Minimum testing frequency
Compressive strength ^a	ASTM C172/C172M, ASTM C31/C31M, and ASTM C39/C39M	Once per 100 cu yd of concrete cast, or every day of casting, whichever is more frequent
Slump	ASTM C143/C143M	
Temperature at time of mixing	ASTM C1064/C1064M	
Density	ASTM C138	Once per 600 cu yd of concrete cast or every 7 days of batching, whichever is more frequent
Air content	ASTM C231/C231M or ASTM C173/C173M ^b	If concrete is air entrained, once for each set of cylinders, and when conditions warrant

^aCylinders must be 6 by 12 inches.

^bASTM C173/C173M must be used for lightweight concrete.

If concrete is batched at more than 1 plant, perform the tests at each plant.

Cure test cylinders for determining time of prestressing loading in the same manner as the concrete in the member.

Cure test cylinders for determining compliance with 28-day strength requirements in the same manner as the member until completion of the steam curing process followed by a water bath or moist room at 60 to 80 degrees F until tested.

For PC concrete that is steam cured, concrete designated by compressive strength is acceptable if its compressive strength reaches the described 28-day compressive strength in no more than the maximum number of days specified or allowed after the concrete is cast.

90-4.01D(2)(d) Temperature Monitoring

90-4.01D(2)(d)(i) General

At a minimum, provide temperature monitoring devices as shown in the following table:

Temperature Monitoring Requirements		
Component	Steam curing	Other curing methods
Tier 1 PC bridge components except piling and deck panels	1 internal temperature sensor for each individually cast member; 1 internal temperature sensor for every 100 feet of bed length for continuously cast elements ^a	1 internal temperature sensor for each individually cast member; 1 internal temperature sensor for every 100 feet of bed length for continuously cast elements ^a
PC piling, deck panels, and PS pavement	1 enclosure temperature sensor for every 200 feet of bed length for continuously cast elements	Not required
Other PC components	1 enclosure temperature sensor for every 200 feet of bed length for continuously cast elements	Not required

^aMembers not instrumented are represented by the nearest internal temperature probe.

Temperature monitoring devices must provide an accurate, continuous, permanent record of the temperature during curing activities.

90-4.01D(2)(d)(ii) Tier 1 Bridge Components

Except for piling and deck panels, provide a temperature monitoring and recording system during concrete placement and curing for tier 1 PC bridge components. The system must consist of temperature sensors connected to a data acquisition system. The system must be capable of recording, printing, and downloading temperature data to a computer. Temperature sensors must be accurate to within ± 2 degrees F.

Position each internal concrete temperature sensor as shown in the following table:

Internal Concrete Sensor Locations	
PC component	Sensor location
Wide flange, 'I', and bulb tee girders	6–8 inches below top surface along center line at midpoint
Other girder shapes	6–8 inches below top surface along center line of stem at midpoint
Deck slabs	Center of element at mid-depth
Other elements	Position sensor to provide maximum concrete cover

Record temperature readings automatically at least every 15 minutes. You may discontinue temperature recording (1) when the maximum internal concrete temperature is falling for a minimum of 1 hour, or (2) immediately before stress transfer to the concrete.

Do not allow the ends of temperature sensors to come into contact with concrete supports, forms, or reinforcement.

Correct equipment failures in temperature control and monitoring and recording systems immediately.

90-4.01D(3) Agency Acceptance

For PC concrete that is steam cured, the Engineer evaluates the compressive strength based on individual tests representing specific portions of production.

For tier 1 PC bridge components that are monitored for internal temperature, the Engineer rejects components if at any temperature sensor (1) the maximum internal concrete temperature exceeds 165 degrees F, or (2) the internal temperature gain exceeds 40 degrees F per hour. If the maximum internal concrete temperature is from 161 to 165 degrees F, the Engineer reduces payment for furnish PC concrete member by a percentage equal to 2 times the difference of the maximum measured temperature in degrees F minus 160.

90-4.02 MATERIALS

You may use Type III portland cement in PC concrete.

The specifications for SCM content in section 90-1.02B(3) do not apply to PC concrete.

For PC concrete, the SCM content must comply with one of the following:

1. Any combination of portland cement and SCM satisfying the following equation:

Equation 1:

$$[(25 \times UF) + (12 \times FA) + (10 \times FB) + (6 \times SL)]/TC \geq X$$

where:

UF = silica fume, metakaolin, or UFFA, including the quantity in blended cement, lb/cu yd

FA = natural pozzolan or fly ash complying with AASHTO M 295, Class F or N, with a CaO content of up to 10 percent, including the quantity in blended cement, lb/cu yd

FB = natural pozzolan or fly ash complying with AASHTO M 295, Class F or N, with a CaO content of greater than 10 percent and up to 15 percent, including the quantity in blended cement, lb/cu yd

SL = GGBFS, including the quantity in blended cement, lb/cu yd

TC = total quantity of cementitious material, lb/cu yd

X = 0.0 for innocuous aggregate, 3.0 for all other aggregate

2. 15 percent Class F fly ash with at least 48 oz of LiNO₃ solution added per 100 lb of portland cement. The CaO content of the fly ash must not exceed 15 percent.
3. Any combination of SCM and portland cement for which the expansion of cementitious material and aggregate does not exceed 0.10 percent when tested under ASTM C1567. Submit test data with each mix design. Test data authorized by the Agency no more than 3 years before the 1st day of the Contract is authorized for the entire Contract. The test data must be for the same concrete mix and must use the same materials and material sources to be used on the Contract.

For tier 1 PC concrete members with internal temperature monitoring:

1. Maximum internal concrete temperature must not exceed 165 degrees F at any temperature sensor
2. Maximum temperature gain must not exceed 40 degrees F per hour at any temperature sensor

If municipally supplied potable water is used for PC concrete, the testing specified in section 90-1.02D is waived unless requested.

Portland cement based repair material must be on the Authorized Material List for precast portland cement based repair material.

90-4.03 CONSTRUCTION

Cure PC concrete using steam curing or any of the methods specified in section 90-1.03B. Cure for the minimum time specified for each method or until the concrete reaches its design strength, whichever is less.

Steam curing must comply with the following:

1. After placing the concrete, hold it for a 4-hour minimum presteaming period. If the ambient air temperature is below 50 degrees F, apply steam during the presteaming period to hold the air surrounding the concrete at a temperature of 50 to 90 degrees F.
2. To prevent moisture loss on the exposed surfaces during the presteaming period, cover the concrete as soon as possible after casting or keep the exposed surfaces wet by fog spray, curing compound, or wet blankets.
3. Enclosures for steam curing must allow free circulation of steam around the concrete and must be constructed to contain the live steam with a minimum moisture loss. The use of tarpaulins or similar flexible covers is allowed if they are kept in good repair and secured in such a way that prevents the loss of steam and moisture.
4. Steam at the jets must be at low pressure and in a saturated condition. Steam jets must not impinge directly on the concrete, test cylinders, or forms. During application of the steam, the temperature rise within the enclosure must not exceed 40 degrees F per hour. Except for internally monitored components, the curing temperature throughout the enclosure must not exceed 150 degrees F. Maintain the curing temperature at a constant level for the time necessary to develop the required transfer strength. Cover control cylinders to prevent moisture loss and place them in a location where the temperature is representative of the average enclosure temperature.
5. Detension the concrete in pretension beds immediately after the steam curing is completed while the concrete and forms are still warm, or maintain the temperature under the enclosure above 60 degrees F until the stress is transferred to the concrete.
6. Curing is complete at the end of the steam curing cycle.

For dimensional tolerances of PC concrete members, comply with the Precast/Prestressed Concrete Institute's *Tolerance Manual for Precast and Prestressed Concrete Construction*, MNL 135-00.

For tier 1 and tier 2 PC concrete members, apply curing compound using power-operated spraying equipment. You may request application by hand spraying for small quantities of PC concrete members. For tier 3 and tier 4 PC concrete members, the application of curing compound may be hand sprayed.

For internally monitored tier 1 PC bridge components with a maximum internal concrete temperature of 161 to 165 degrees F, the following apply:

1. Do not apply curing compound.
2. Cure an additional 7 days using the water cure method.
3. After 7 days apply a silane waterproofing treatment under the following conditions:
 - 3.1. Silane waterproofing treatment selected for use must be on the Authorized Material List for silane reactive penetrating sealers.
 - 3.2. Concrete surfaces must be completely dry when silane is applied.
 - 3.3. Apply a single application of undiluted silane under the manufacturer's application instructions until surfaces are saturated.

90-4.04 PAYMENT

Not Used

90-5 SELF-CONSOLIDATING CONCRETE

Not Used

90-6 LIGHTWEIGHT CONCRETE

Not Used

90-7 PERVIOUS CONCRETE

Not Used

90-8 RESERVED

90-9 RETURNED PLASTIC CONCRETE

Not Used

90-10-90-16 RESERVED

Replace section 92 with:

92 ASPHALT BINDERS

92-1.01 GENERAL

92-1.01A Summary

Section 92 includes specifications for furnishing asphalt binders.

92-1.01B Definitions

asphalt binder: Asphalt from refined petroleum or from a mixture of refined liquid asphalt and refined solid asphalt prepared from crude petroleum.

modified asphalt binder: Asphalt binder modified with polymers, crumb rubber, or both.

92-1.01C Submittals

Reserved

92-1.01D Quality Assurance

92-1.01D(1) General

Reserved

92-1.01D(2) Certification

Asphalt binder suppliers must comply with the Caltrans Certification Program for Suppliers of Asphalt. For a copy of the certification program, go to the METS website.

92-1.01D(3) Sampling

A sampling device must be located in the asphalt binder feed line connecting the plant storage tanks to the asphalt binder weighing system or spray bar. The sampling device must be accessible from 24 to 30 inches above the platform. Provide a receptacle for flushing the sampling device.

The valve for the sampling device must be 1/2 to 3/4 inch in diameter and must allow a 1-quart sample to be taken slowly at any time during plant activities.

In the Engineer's presence, take two 1-quart samples per day during plant activities for the project. Sample containers must be 1-quart capacity and include round friction-top lids.

92-1.02 MATERIALS

92-1.02A General

Asphalt binder must not include residues caused by artificial distillation of coal, coal tar, or paraffin. Asphalt binder must be homogeneous and free of water.

92-1.02B Performance Grade Asphalt Binders

PG asphalt binder must comply with the requirements shown in the following table:

PG Asphalt Binders

Quality characteristic	Test method	Requirement				
		PG 58-22 ^a	PG 64-10	PG 64-16	PG 64-28	PG 70-10
Original Binder						
Flash point (min, °C)	AASHTO T 48	230	230	230	230	230
Solubility ^b (min, %)	AASHTO T 44	99	99	99	99	99
Viscosity at 135 °C ^c (max, Pa•s)	AASHTO T 316	3.0	3.0	3.0	3.0	3.0
Dynamic shear Test temperature at 10 rad/s (°C) G*/sin(delta) (min, kPa) G*/sin(delta) (max, kPa)	AASHTO T 315	58 1.00 2.00	64 1.00 2.00	64 1.00 2.00	64 1.00 2.00	70 1.00 2.00
RTFO ^f test ^e mass loss (max, %)	AASHTO T 240	1.00	1.00	1.00	1.00	1.00
RTFO ^f Test Aged Binder						
Dynamic shear Test temperature at 10 rad/s (°C) G*/sin(delta) (min, kPa)	AASHTO T 315	58 2.20	64 2.20	64 2.20	64 2.20	70 2.20
Ductility at 25 °C (min, cm)	AASHTO T 51	75	75	75	75	75
PAV ^g Test temperature (°C)	AASHTO R 28	100	100	100	100	110
RTFO ^f Test and PAV ^g Aged Binder						
Dynamic shear, Test temperature at 10 rad/s (°C) G*sin(delta) (max, kPa)	AASHTO T 315	22 ^d 5000	31 ^d 5000	28 ^d 5000	22 ^d 5000	34 ^d 5000
Creep stiffness, Test temperature, °C S-value (max, MPa) M-value (min)	AASHTO T 313	-12 300 0.300	0 300 0.300	-6 300 0.300	-18 300 0.300	0 300 0.300

^aUse as asphalt rubber base stock for high mountain and high desert area.

^bThe Engineer waives solubility requirements if the supplier is an authorized material source as defined by the Caltrans *Certification Program for Suppliers of Asphalt*.

^cThe Engineer waives this specification if the supplier provides written certification the asphalt binder can be adequately pumped and mixed at temperatures meeting applicable safety standards.

^dTest the sample at 3 °C higher if it fails at the specified test temperature. G*/sin(delta) remains 5000 kPa maximum.

^eThe residue from mass change determination may be used for other tests.

^fRTFO means rolling thin film oven.

^gPAV means Pressure Aging Vessel.

PG modified asphalt binder must comply with the requirements shown in the following table:

PG Modified Asphalt Binders

Quality characteristic	Test method	Requirement		
		PG 58-34 M	PG 64-28 M	PG 76-22 M
Original Binder				
Flash point (min, °C)	AASHTO T 48	230	230	230
Solubility (min, %)	AASHTO T 44 ^a	97.5	97.5	97.5 ^b
Viscosity at 135 °C ^c (max, Pa•s)	AASHTO T 316	3.0	3.0	3.0
Dynamic shear, Test temperature at 10 rad/s (°C) G*/sin(delta) (min, kPa)	AASHTO T 315	58 1.00	64 1.00	76 1.00
RTFO ^g test ^d , Mass loss (max, %)	AASHTO T 240	1.00	1.00	1.00
RTFO ^g Test Aged Binder				
Dynamic shear, Test temperature at 10 rad/s (°C) G*/sin(delta) (min, kPa)	AASHTO T 315	58 2.20	64 2.20	76 2.20
Dynamic shear, Test temperature at 10 rad/s, °C Delta (max, degree)	AASHTO T 315	80 ^e	80 ^e	80 ^e
Elastic recovery ^f , Test temperature (°C) Recovery (min, %)	AASHTO T 301	25 75	25 75	25 65
PAV ^h , Temperature (°C)	AASHTO R 28	100	100	110
RTFO ^g Test and PAV ^h Aged Binder				
Dynamic shear, Test temperature at 10 rad/s (°C) G*sin(delta) (max, kPa)	AASHTO T 315	16 5000	22 5000	31 5000
Creep stiffness, Test temperature (°C) S-value (max, Mpa) M-value (min)	AASHTO T 313	-24 300 0.300	-18 300 0.300	-12 300 0.300

^aThe Agency allows ASTM D5546 or ASTM D7553 instead of AASHTO T 44. Particles recovered from ASTM D5546 or ASTM D7553 or AASHTO T 44 must be less than 250 µm.

^bReport only for spray application.

^cThe Engineer waives the viscosity requirements if the supplier provides written certification the asphalt binder can be adequately pumped and mixed at temperatures meeting applicable safety standards.

^dThe residue from mass change determination may be used for other tests.

^eTest temperature is the temperature at which G*/sin(delta) is 2.2 kPa. A graph of log G*/sin(delta) plotted against temperature may be used to determine the test temperature when G*/sin(delta) is 2.2 kPa. A graph of (delta) versus temperature may be used to determine delta at the temperature when G*/sin(delta) is 2.2 kPa. The graph must have at least 2 points that envelope G*/sin(delta) of 2.2 kPa, and the test temperature must not be more than 6 degree C apart. The Engineer also accepts direct measurement of delta at the temperature when G*/sin(delta) is 2.2 kPa.

^fTests without a force ductility clamp may be performed.

^gRTFO means rolling thin film oven.

^hPAV means Pressure Aging Vessel.

SECTION 92

ASPHALT BINDERS

Do not modify PG modified asphalt binder using polyphosphoric acid.

Crumb rubber modifier used must be on the Authorized Materials List for crumb rubber modifier.

Production equipment for PG modified asphalt binder with crumb rubber modifier must be authorized under the Caltrans *MPQP*.

Crumb rubber must be derived from waste tires described in Pub Res Code § 42703 and must be free from contaminants including fabric, metal, minerals, and other nonrubber substances.

PG modified asphalt binder modified with crumb rubber must be homogeneous and must not contain visible particles of crumb rubber.

The supplier of PG modified asphalt binder modified with crumb rubber must:

1. Report the quantity of crumb rubber by weight of asphalt binder
2. Certify a minimum of 10 percent of crumb rubber by weight of asphalt binder

92-1.03 CONSTRUCTION

Not Used

92-1.04 PAYMENT

If asphalt binder is paid for as a bid item, the payment quantity for any type of asphalt binder is measured by weight.

If a partial load of asphalt binder is used and a scale is not available within 20 miles, the weight of asphalt binder remaining on the transporting vehicle may be determined from volumetric measurements provided that the asphalt binder is delivered in a calibrated tank with a measuring stick and calibration card or trucks equipped with a vehicle tank meter and a calibrated thermometer that determines the asphalt binder temperature at delivery.

Before converting the volume to weight, the volume measured must be reduced to what the asphalt binder would occupy at 60 degrees F. Use the following conversion table to convert asphalt binder volume to weight:

Conversion Table

t	A	B	t	A	B	t	A	B
-13	1.0257	1.0294	22	1.0133	1.0152	57	1.0010	1.0012
-12	1.0253	1.0290	23	1.0129	1.0148	58	1.0007	1.0008
-11	1.0250	1.0286	24	1.0126	1.0144	59	1.0003	1.0004
-10	1.0246	1.0282	25	1.0122	1.0140	60	1.0000	1.0000
-9	1.0243	1.0277	26	1.0119	1.0136	61	0.9996	0.9996
-8	1.0239	1.0273	27	1.0115	1.0132	62	0.9993	0.9992
-7	1.0236	1.0269	28	1.0112	1.0128	63	0.9989	0.9988
-6	1.0232	1.0265	29	1.0108	1.0124	64	0.9986	0.9984
-5	1.0228	1.0261	30	1.0105	1.0120	65	0.9982	0.9980
-4	1.0225	1.0257	31	1.0101	1.0116	66	0.9979	0.9976
-3	1.0221	1.0253	32	1.0098	1.0112	67	0.9975	0.9972
-2	1.0218	1.0249	33	1.0094	1.0108	68	0.9972	0.9968
-1	1.0214	1.0245	34	1.0091	1.0104	69	0.9968	0.9964
0	1.0211	1.0241	35	1.0087	1.0100	70	0.9965	0.9960
1	1.0207	1.0237	36	1.0084	1.0096	71	0.9961	0.9956
2	1.0204	1.0233	37	1.0080	1.0091	72	0.9958	0.9952
3	1.0200	1.0229	38	1.0077	1.0087	73	0.9954	0.9948
4	1.0197	1.0225	39	1.0073	1.0083	74	0.9951	0.9944
5	1.0193	1.0221	40	1.0070	1.0079	75	0.9947	0.9940
6	1.0189	1.0217	41	1.0066	1.0075	76	0.9944	0.9936
7	1.0186	1.0212	42	1.0063	1.0071	77	0.9940	0.9932
8	1.0182	1.0208	43	1.0059	1.0067	78	0.9937	0.9928
9	1.0179	1.0204	44	1.0056	1.0063	79	0.9933	0.9924
10	1.0175	1.0200	45	1.0052	1.0059	80	0.9930	0.9920
11	1.0172	1.0196	46	1.0049	1.0055	81	0.9926	0.9916
12	1.0168	1.0192	47	1.0045	1.0051	82	0.9923	0.9912
13	1.0165	1.0188	48	1.0042	1.0047	83	0.9919	0.9908
14	1.0161	1.0184	49	1.0038	1.0043	84	0.9916	0.9904
15	1.0158	1.0180	50	1.0035	1.0039	85	0.9913	0.9900
16	1.0154	1.0176	51	1.0031	1.0035	86	0.9909	0.9897
17	1.0151	1.0172	52	1.0028	1.0031	87	0.9906	0.9893
18	1.0147	1.0168	53	1.0024	1.0027	88	0.9902	0.9889
19	1.0144	1.0164	54	1.0021	1.0023	89	0.9899	0.9885
20	1.0140	1.0160	55	1.0017	1.0019	90	0.9895	0.9881
21	1.0136	1.0156	56	1.0014	1.0016	91	0.9892	0.9877

Notes:

 t = observed temperature in degrees F

A = multiplier for reducing volumes to the basis of 60 °F, for asphalt binder with density at 60 °F of 60.3 pcf or higher

B = multiplier for reducing volumes to the basis of 60 °F, for asphalt binder with density at 60 °F of from 53.1 to 60.2 pcf

Conversion Table—Continued

t	A	B	t	A	B	t	A	B
92	0.9888	0.9873	127	0.9768	0.9736	162	0.9648	0.9601
93	0.9885	0.9869	128	0.9764	0.9732	163	0.9645	0.9597
94	0.9881	0.9865	129	0.9761	0.9728	164	0.9641	0.9593
95	0.9878	0.9861	130	0.9757	0.9724	165	0.9638	0.9589
96	0.9874	0.9857	131	0.9754	0.9720	166	0.9634	0.9585
97	0.9871	0.9853	132	0.9750	0.9716	167	0.9631	0.9581
98	0.9867	0.9849	133	0.9747	0.9713	168	0.9628	0.9578
99	0.9864	0.9845	134	0.9744	0.9709	169	0.9624	0.9574
100	0.9861	0.9841	135	0.9740	0.9705	170	0.9621	0.9570
101	0.9857	0.9837	136	0.9737	0.9701	171	0.9617	0.9566
102	0.9854	0.9834	137	0.9733	0.9697	172	0.9614	0.9562
103	0.9850	0.9830	138	0.9730	0.9693	173	0.9611	0.9558
104	0.9847	0.9826	139	0.9726	0.9689	174	0.9607	0.9555
105	0.9843	0.9822	140	0.9723	0.9685	175	0.9604	0.9551
106	0.9840	0.9818	141	0.9720	0.9682	176	0.9600	0.9547
107	0.9836	0.9814	142	0.9716	0.9678	177	0.9597	0.9543
108	0.9833	0.9810	143	0.9713	0.9674	178	0.9594	0.9539
109	0.9830	0.9806	144	0.9709	0.9670	179	0.9590	0.9535
110	0.9826	0.9802	145	0.9706	0.9666	180	0.9587	0.9532
111	0.9823	0.9798	146	0.9703	0.9662	181	0.9583	0.9528
112	0.9819	0.9794	147	0.9699	0.9658	182	0.9580	0.9524
113	0.9816	0.9790	148	0.9696	0.9654	183	0.9577	0.9520
114	0.9812	0.9787	149	0.9692	0.9651	184	0.9573	0.9516
115	0.9809	0.9783	150	0.9689	0.9647	185	0.9570	0.9513
116	0.9805	0.9779	151	0.9685	0.9643	186	0.9567	0.9509
117	0.9802	0.9775	152	0.9682	0.9639	187	0.9563	0.9505
118	0.9799	0.9771	153	0.9679	0.9635	188	0.9560	0.9501
119	0.9795	0.9767	154	0.9675	0.9631	189	0.9556	0.9497
120	0.9792	0.9763	155	0.9672	0.9627	190	0.9553	0.9493
121	0.9788	0.9759	156	0.9668	0.9624	191	0.9550	0.9490
122	0.9785	0.9755	157	0.9665	0.9620	192	0.9546	0.9486
123	0.9781	0.9751	158	0.9662	0.9616	193	0.9543	0.9482
124	0.9778	0.9748	159	0.9658	0.9612	194	0.9540	0.9478
125	0.9774	0.9744	160	0.9655	0.9608	195	0.9536	0.9474
126	0.9771	0.9740	161	0.9651	0.9604	196	0.9533	0.9471

Notes:

 t = observed temperature in degrees F A = multiplier for reducing volumes to the basis of 60 °F, for asphalt binder with density at 60 °F of 60.3 pcf or higher B = multiplier for reducing volumes to the basis of 60 °F, for asphalt binder with density at 60 °F of from 53.1 to 60.2 pcf

Conversion Table—Continued

t	A	B	t	A	B	t	A	B
197	0.9529	0.9467	232	0.9412	0.9335	267	0.9296	0.9204
198	0.9526	0.9463	233	0.9409	0.9331	268	0.9292	0.9201
199	0.9523	0.9459	234	0.9405	0.9327	269	0.9289	0.9197
200	0.9519	0.9455	235	0.9402	0.9324	270	0.9286	0.9193
201	0.9516	0.9452	236	0.9399	0.9320	271	0.9282	0.9190
202	0.9513	0.9448	237	0.9395	0.9316	272	0.9279	0.9186
203	0.9509	0.9444	238	0.9392	0.9312	273	0.9276	0.9182
204	0.9506	0.9440	239	0.9389	0.9309	274	0.9273	0.9179
205	0.9503	0.9437	240	0.9385	0.9305	275	0.9269	0.9175
206	0.9499	0.9433	241	0.9382	0.9301	276	0.9266	0.9171
207	0.9496	0.9429	242	0.9379	0.9297	277	0.9263	0.9168
208	0.9492	0.9425	243	0.9375	0.9294	278	0.9259	0.9164
209	0.9489	0.9421	244	0.9372	0.9290	279	0.9256	0.9160
210	0.9486	0.9418	245	0.9369	0.9286	280	0.9253	0.9156
211	0.9482	0.9414	246	0.9365	0.9283	281	0.9249	0.9153
212	0.9479	0.9410	247	0.9362	0.9279	282	0.9246	0.9149
213	0.9476	0.9406	248	0.9359	0.9275	283	0.9243	0.9145
214	0.9472	0.9403	249	0.9355	0.9271	284	0.9240	0.9142
215	0.9469	0.9399	250	0.9352	0.9268	285	0.9236	0.9138
216	0.9466	0.9395	251	0.9349	0.9264	286	0.9233	0.9134
217	0.9462	0.9391	252	0.9345	0.9260	287	0.9230	0.9131
218	0.9459	0.9387	253	0.9342	0.9256	288	0.9226	0.9127
219	0.9456	0.9384	254	0.9339	0.9253	289	0.9223	0.9123
220	0.9452	0.9380	255	0.9335	0.9249	290	0.9220	0.9120
221	0.9449	0.9376	256	0.9332	0.9245	291	0.9217	0.9116
222	0.9445	0.9372	257	0.9329	0.9242	292	0.9213	0.9112
223	0.9442	0.9369	258	0.9325	0.9238	293	0.9210	0.9109
224	0.9439	0.9365	259	0.9322	0.9234	294	0.9207	0.9105
225	0.9435	0.9361	260	0.9319	0.9230	295	0.9203	0.9101
226	0.9432	0.9357	261	0.9316	0.9227	296	0.9200	0.9098
227	0.9429	0.9354	262	0.9312	0.9223	297	0.9197	0.9094
228	0.9425	0.9350	263	0.9309	0.9219	298	0.9194	0.9090
229	0.9422	0.9346	264	0.9306	0.9216	299	0.9190	0.9087
230	0.9419	0.9342	265	0.9302	0.9212	300	0.9187	0.9083
231	0.9415	0.9339	266	0.9299	0.9208	301	0.9184	0.9079

Notes:

 t = observed temperature in degrees F A = multiplier for reducing volumes to the basis of 60 °F, for asphalt binder with density at 60 °F of 60.3 pcf or higher B = multiplier for reducing volumes to the basis of 60 °F, for asphalt binder with density at 60 °F of from 53.1 to 60.2 pcf

Conversion Table—Continued

t	A	B	t	A	B	t	A	B
302	0.9180	0.9076	337	0.9066	0.8949	372	0.8953	0.8823
303	0.9177	0.9072	338	0.9063	0.8945	373	0.8950	0.8820
304	0.9174	0.9068	339	0.9060	0.8942	374	0.8947	0.8816
305	0.9171	0.9065	340	0.9057	0.8938	375	0.8944	0.8813
306	0.9167	0.9061	341	0.9053	0.8934	376	0.8940	0.8809
307	0.9164	0.9058	342	0.9050	0.8931	377	0.8937	0.8806
308	0.9161	0.9054	343	0.9047	0.8927	378	0.8934	0.8802
309	0.9158	0.9050	344	0.9044	0.8924	379	0.8931	0.8798
310	0.9154	0.9047	345	0.9040	0.8920	380	0.8928	0.8795
311	0.9151	0.9043	346	0.9037	0.8916	381	0.8924	0.8791
312	0.9148	0.9039	347	0.9034	0.8913	382	0.8921	0.8788
313	0.9144	0.9036	348	0.9031	0.8909	383	0.8918	0.8784
314	0.9141	0.9032	349	0.9027	0.8906	384	0.8915	0.8781
315	0.9138	0.9028	350	0.9024	0.8902	385	0.8911	0.8777
316	0.9135	0.9025	351	0.9021	0.8898	386	0.8908	0.8774
317	0.9131	0.9021	352	0.9018	0.8895	387	0.8905	0.8770
318	0.9128	0.9018	353	0.9014	0.8891	388	0.8902	0.8767
319	0.9125	0.9014	354	0.9011	0.8888	389	0.8899	0.8763
320	0.9122	0.9010	355	0.9008	0.8884	390	0.8895	0.8760
321	0.9118	0.9007	356	0.9005	0.8880	391	0.8892	0.8756
322	0.9115	0.9003	357	0.9002	0.8877	392	0.8889	0.8752
323	0.9112	0.8999	358	0.8998	0.8873	393	0.8886	0.8749
324	0.9109	0.8996	359	0.8995	0.8870	394	0.8883	0.8745
325	0.9105	0.8992	360	0.8992	0.8866	395	0.8880	0.8742
326	0.9102	0.8988	361	0.8989	0.8863	396	0.8876	0.8738
327	0.9099	0.8985	362	0.8985	0.8859	397	0.8873	0.8735
328	0.9096	0.8981	363	0.8982	0.8855	398	0.8870	0.8731
329	0.9092	0.8978	364	0.8979	0.8852	399	0.8867	0.8728
330	0.9089	0.8974	365	0.8976	0.8848	400	0.8864	0.8724
331	0.9086	0.8970	366	0.8973	0.8845	401	0.8860	0.8721
332	0.9083	0.8967	367	0.8969	0.8841	402	0.8857	0.8717
333	0.9079	0.8963	368	0.8966	0.8838	403	0.8854	0.8714
334	0.9076	0.8960	369	0.8963	0.8834	404	0.8851	0.8710
335	0.9073	0.8956	370	0.8960	0.8830	405	0.8848	0.8707
336	0.9070	0.8952	371	0.8956	0.8827	406	0.8844	0.8703

Notes:

 t = observed temperature in degrees F A = multiplier for reducing volumes to the basis of 60 °F, for asphalt binder with density at 60 °F of 60.3 pcf or higher B = multiplier for reducing volumes to the basis of 60 °F, for asphalt binder with density at 60 °F of from 53.1 to 60.2 pcf

Conversion Table—Continued

t	A	B	t	A	B	t	A	B
407	0.8841	0.8700	442	0.8730	0.8578	477	0.8621	0.8457
408	0.8838	0.8696	443	0.8727	0.8574	478	0.8617	0.8454
409	0.8835	0.8693	444	0.8724	0.8571	479	0.8614	0.8450
410	0.8832	0.8689	445	0.8721	0.8567	480	0.8611	0.8447
411	0.8829	0.8686	446	0.8718	0.8564	481	0.8608	0.8443
412	0.8825	0.8682	447	0.8715	0.8560	482	0.8605	0.8440
413	0.8822	0.8679	448	0.8711	0.8557	483	0.8602	0.8437
414	0.8819	0.8675	449	0.8708	0.8553	484	0.8599	0.8433
415	0.8816	0.8672	450	0.8705	0.8550	485	0.8596	0.8430
416	0.8813	0.8668	451	0.8702	0.8546	486	0.8593	0.8426
417	0.8809	0.8665	452	0.8699	0.8543	487	0.8589	0.8322
418	0.8806	0.8661	453	0.8696	0.8540	488	0.8586	0.8318
419	0.8803	0.8658	454	0.8693	0.8536	489	0.8583	0.8315
420	0.8800	0.8654	455	0.8689	0.8533	490	0.8580	0.8311
421	0.8797	0.8651	456	0.8686	0.8529	491	0.8577	0.8308
422	0.8794	0.8647	457	0.8683	0.8526	492	0.8574	0.8406
423	0.8790	0.8644	458	0.8680	0.8522	493	0.8571	0.8403
424	0.8787	0.8640	459	0.8677	0.8519	494	0.8568	0.8399
425	0.8784	0.8637	460	0.8674	0.8515	495	0.8565	0.8396
426	0.8781	0.8633	461	0.8671	0.8512	496	0.8561	0.8392
427	0.8778	0.8630	462	0.8667	0.8509	497	0.8558	0.8389
428	0.8775	0.8626	463	0.8664	0.8505	498	0.8555	0.8386
429	0.8771	0.8623	464	0.8661	0.8502	499	0.8552	0.8382
430	0.8768	0.8619	465	0.8658	0.8498	500	0.8549	0.8379
431	0.8765	0.8616	466	0.8655	0.8495	501	0.8546	0.8376
432	0.8762	0.8612	467	0.8652	0.8491	502	0.8543	0.8372
433	0.8759	0.8609	468	0.8649	0.8488	503	0.8540	0.8369
434	0.8756	0.8605	469	0.8646	0.8485	504	0.8537	0.8365
435	0.8752	0.8602	470	0.8642	0.8481	505	0.8534	0.8362
436	0.8749	0.8598	471	0.8639	0.8478	506	0.8530	0.8359
437	0.8746	0.8595	472	0.8636	0.8474	507	0.8527	0.8355
438	0.8743	0.8591	473	0.8633	0.8471	508	0.8524	0.8352
439	0.8740	0.8588	474	0.8630	0.8467	509	0.8521	0.8348
440	0.8737	0.8584	475	0.8627	0.8464	510	0.8518	0.8345
441	0.8734	0.8581	476	0.8624	0.8461	511	0.8515	0.8342

Notes:

 t = observed temperature in degrees F

A = multiplier for reducing volumes to the basis of 60 °F, for asphalt binder with density at 60 °F of 60.3 pcf or higher

B = multiplier for reducing volumes to the basis of 60 °F, for asphalt binder with density at 60 °F of from 53.1 to 60.2 pcf

Conversion Table—Continued

t	A	B	t	A	B	t	A	B
512	0.8512	0.8338	537	0.8435	0.8255	562	0.8358	0.8172
513	0.8509	0.8335	538	0.8432	0.8251	563	0.8355	0.8168
514	0.8506	0.8332	539	0.8429	0.8248	564	0.8352	0.8165
515	0.8503	0.8328	540	0.8426	0.8245	565	0.8349	0.8162
516	0.8500	0.8325	541	0.8423	0.8241	566	0.8346	0.8158
517	0.8496	0.8322	542	0.8420	0.8238	567	0.8343	0.8155
518	0.8493	0.8318	543	0.8417	0.8235	568	0.8340	0.8152
519	0.8490	0.8315	544	0.8413	0.8231	569	0.8337	0.8149
520	0.8487	0.8311	545	0.8410	0.8228	570	0.8334	0.8145
521	0.8484	0.8308	546	0.8407	0.8225	571	0.8331	0.8142
522	0.8481	0.8305	547	0.8404	0.8221	572	0.8328	0.8139
523	0.8478	0.8301	548	0.8401	0.8218	573	0.8325	0.8135
524	0.8475	0.8298	549	0.8398	0.8215	574	0.8322	0.8132
525	0.8472	0.8295	550	0.8395	0.8211	575	0.8319	0.8129
526	0.8469	0.8291	551	0.8392	0.8208	576	0.8316	0.8126
527	0.8466	0.8288	552	0.8389	0.8205	577	0.8313	0.8122
528	0.8463	0.8285	553	0.8386	0.8201	578	0.8310	0.8119
529	0.8459	0.8281	554	0.8383	0.8198	579	0.8307	0.8116
530	0.8456	0.8278	555	0.8380	0.8195	580	0.8304	0.8112
531	0.8453	0.8275	556	0.8377	0.8191	581	0.8301	0.8109
532	0.8450	0.8271	557	0.8374	0.8188	582	0.8298	0.8106
533	0.8447	0.8268	558	0.8371	0.8185	583	0.8295	0.8103
534	0.8444	0.8265	559	0.8368	0.8182	584	0.8292	0.8099
535	0.8441	0.8261	560	0.8365	0.8178	585	0.8289	0.8096
536	0.8438	0.8258	561	0.8362	0.8175	586	0.8286	0.8093

Notes:

t = observed temperature in degrees*A* = multiplier for reducing volumes to the basis of 60 °F, for asphalt binder with density at 60 °F of 60.3 pcf or higher*B* = multiplier for reducing volumes to the basis of 60 °F, for asphalt binder with density at 60 °F of from 53.1 to 60.2 pcf

Replace section 94 with:

94 ASPHALTIC EMULSIONS

94-1.01 GENERAL

94-1.01A Summary

Section 94 includes specifications for furnishing asphaltic emulsions.

94-1.01B Definitions

Reserved

94-1.01C Submittals

Submit an SDS for each shipment of asphaltic emulsion to the job site.

If you use the asphaltic emulsion before the Agency's sampling and testing is complete, submit a certificate of compliance for each shipment to the job site. The certificate of compliance must include:

1. Shipment number and shipment date
2. Source refinery, consignee, and destination
3. Type and description of material with specific gravity and quantity
4. Contract or purchase order number
5. Signature by the manufacturer of the material and a statement that the material complies with the Contract
6. Test results showing the material complies with section 94-1.02

If no certificate of compliance is submitted, do not use asphaltic emulsion until authorized.

94-1.01D Quality Assurance

Sample asphaltic emulsion under AASHTO T 40.

Store samples in clean and airtight sealed containers. Storage temperature must be at least 40 degrees F until tested.

The Engineer may waive the settlement test if the asphaltic emulsion is used in less than 5 days from the time the sample is taken.

94-1.02 MATERIALS

94-1.02A General

Asphaltic emulsions must be composed of a bituminous material uniformly emulsified with water and an emulsifying or a stabilizing agent. Polymer modified asphaltic emulsion must contain a polymer.

Asphaltic emulsion must be homogeneous. Within 30 days after delivery and if freezing has not caused separation, the asphaltic emulsion must be homogeneous after thorough mixing.

Asphaltic emulsion must be anionic, cationic, polymer modified, or quick setting.

94-1.02B Anionic Asphaltic Emulsions

Anionic asphaltic emulsion must be rapid setting, medium setting, or slow setting.

Rapid-setting anionic asphaltic emulsion must comply with the requirements shown in the following table:

Rapid-Setting Anionic Asphaltic Emulsion Requirements

Quality characteristic	Test method	Requirement	
		Grade RS1	Grade RS2
Saybolt Furol viscosity, @ 25 °C (Saybolt Furol seconds)	AASHTO T 59	20–100	--
Saybolt Furol viscosity, @ 50 °C (Saybolt Furol seconds)		--	75–400
Settlement, 5 days (max, %)		5	5
Storage stability test, 1 day (max, %) ^a		1	1
Demulsibility, 35 ml, 0.02 N CaCl ₂ (min, %) ^b		60	60
Sieve test (max, %)		0.10	0.10
Residue by distillation (min, %)		55	63
Tests on residue from distillation test:			
Penetration, 25 °C		100 ^c –200	100 ^c –200
Ductility, 25 °C, 50 mm/minute (min, mm)		400	400
Solubility in trichloroethylene (min, %)		97.5	97.5

^aThe 24-hour storage stability test may be used instead of the 5-day settlement test.

^bThe demulsibility test must be made within 30 days from date of shipment.

^cA harder base asphalt meeting current asphalt binder specifications may be specified if the test requirements on the residue from distillation are waived.

Medium-setting anionic asphaltic emulsion must comply with the requirements shown in the following table:

Medium-Setting Anionic Asphaltic Emulsion Requirements

Quality characteristic	Test method	Requirement		
		Grade MS1	Grade MS2	Grade MS2h
Saybolt Furol viscosity, @ 25 °C (Saybolt Furol seconds)	AASHTO T 59	20–100	100 min	100 min
Settlement, 5 days (max, %)		5	5	5
Storage stability test, 1 day (max, %) ^a		1	1	1
Coating ability and water resistance:				
Coating, dry aggregate		good	good	good
Coating, after spraying		fair	fair	fair
Coating, wet aggregate		fair	fair	fair
Coating, after spraying		fair	fair	fair
Sieve test (max, %)		0.10	0.10	0.10
Residue by distillation (min, %)		55	65	65
Tests on residue from distillation test:				
Penetration, 25 °C		100–200	100–200	40–90
Ductility, 25 °C, 50 mm/minute (min, mm)		400	400	400
Solubility in trichloroethylene (min, %)		97.5	97.5	97.5

^aThe 24-hour storage stability test may be used instead of the 5-day settlement test.

Slow-setting anionic asphaltic emulsion must comply with the requirements shown in the following table:

Slow-Setting Anionic Asphaltic Emulsion Requirements

Quality characteristic	Test method	Requirement	
		Grade SS1	Grade SS1h
Saybolt Furol viscosity, @ 25 °C (Saybolt Furol seconds)	AASHTO T 59	20–100	20–100
Settlement, 5 days (max, %)		5	5
Storage stability test, 1 day (max, %) ^a		1	1
Cement mixing test (max, %)		2.0	2.0
Sieve test (max, %)		0.10	0.10
Residue by distillation (min, %)		57	57
Tests on residue from distillation test:			
Penetration, 25 °C		100–200	40–90
Ductility, 25 °C, 50 mm/minute (min, mm)		400	400
Solubility in trichloroethylene (min, %)		97.5	97.5

^aThe 24-hour storage stability test may be used instead of the 5-day settlement test.

94-1.02C Cationic Asphaltic Emulsions

Cationic asphaltic emulsion must be rapid, medium, or slow setting.

Rapid-setting cationic asphaltic emulsion must comply with the requirements shown in the following table:

Rapid-Setting Cationic Asphaltic Emulsion Requirements

Quality characteristic	Test method	Requirement	
		Grade CRS1	Grade CRS2
Saybolt Furol viscosity, @ 50 °C (Saybolt Furol seconds)	AASHTO T 59	20–100	100–400
Settlement, 5 days (max, %)		5	5
Storage stability test, 1 day (max, %) ^a		1	1
Demulsibility, 35 ml, 0.8 % sodium dioctyl sulfosuccinate (min, %) ^b		40	40
Particle charge test		positive	positive
Sieve test (max, %)		0.10	0.10
Distillation:			
Oil distillate by volume of emulsion (max, %)		3	3
Residue (min, %)		60	65
Tests on residue		97.5	97.5
Tests on residue from distillation test:			
Penetration, 25 °C		100 ^c –250	100 ^c –250
Ductility, 25 °C, 50 mm/minute (min, mm)		400	400
Solubility in trichloroethylene (min, %)		97.5	97.5

^aThe 24-hour storage stability test may be used instead of the 5-day settlement test.

^bThe demulsibility test must be made within 30 days from date of shipment.

^cA harder base asphalt meeting current asphalt binder specifications may be specified if the test requirements on the residue from distillation are waived.

Medium-setting cationic asphaltic emulsion must comply with the requirements shown in the following table:

Medium-Setting Cationic Asphaltic Emulsion Requirements

Quality characteristic	Test method	Requirement		
		Grade CMS2S	Grade CMS2	Grade CMS2h
Saybolt Furol viscosity, @ 50 °C (Saybolt Furol seconds)	AASHTO T 59	50–450	50–450	50–450
Settlement, 5 days (max, %)		5	5	5
Storage stability test, 1 day (max, %) ^a		1	1	1
Coating ability and water resistance:				
Coating, dry aggregate		good	good	good
Coating, after spraying		fair	fair	fair
Coating, wet aggregate		fair	fair	fair
Coating, after spraying		fair	fair	fair
Particle charge test		positive	positive	positive
Sieve test (max, %)		0.10	0.10	0.10
Distillation:				
Oil distillate by volume of emulsion (max, %)		20	12	12
Residue (min, %)		60	65	65
Tests on residue from distillation test:				
Penetration, 25 °C		100–250	100–250	40–90
Ductility, 25 °C, 50 mm/minute (min, mm)		400	400	400
Solubility in trichloroethylene (min, %)		97.5	97.5	97.5

^aThe 24-hour storage stability test may be used instead of the 5-day settlement test.

Slow-setting cationic asphaltic emulsion must comply with the requirements shown in the following table:

Slow-Setting Cationic Asphaltic Emulsion Requirements

Quality characteristic	Test method	Requirement	
		Grade CSS1	Grade CSS1h
Saybolt Furol viscosity, @ 25 °C (Saybolt Furol seconds)	AASHTO T 59	20–100	20–100
Settlement, 5 days (max, %)		5	5
Storage stability test, 1 day (max, %) ^a		1	1
Particle charge test		Positive ^b	Positive ^b
Sieve test (max, %)		0.10	0.10
Cement mixing test (max, %)		2.0	2.0
Residue by distillation (min, %)		57	57
Tests on residue from distillation test:			
Penetration, 25 °C		100–250	40–90
Ductility, 25 °C, 50 mm/minute (min, mm)		400	400
Solubility in trichloroethylene (min, %)		97.5	97.5

^aThe 24-hour storage stability test may be used instead of the 5-day settlement test.

^bMust comply with a pH requirement of 6.7 maximum under ASTM E70 if the particle charge test result is inconclusive.

94-1.02D Polymer Modified Asphaltic Emulsions

Polymer modified asphaltic emulsion must comply with the requirements shown in the following table:

Polymer Modified Asphaltic Emulsion Requirements

Quality characteristic	Test method	Requirement			
		Anionic		Cationic	
		Grade PMRS2	Grade PMRS2h	Grade PMCRS2	Grade PMCRS2h
Saybolt Furol viscosity, @ 50 °C (Saybolt Furol seconds)	AASHTO T 59	75–300	75–300	75–350	75–350
Settlement, 5 days (max, %)		5	5	5	5
Storage stability test, 1 day (max, %)		1	1	1	1
Sieve test (max, %)		0.30	0.30	0.30	0.30
Demulsibility (min, %)		60 ^a	60 ^a	40 ^b	40 ^b
Particle charge		--	--	positive	positive
Ash content (max, %)	ASTM D3723	0.2	0.2	0.2	0.2
Residue by evaporation (min, %)	California Test 331	65	65	65	65
Tests on residue from evaporation test:					
Penetration, 25 °C	AASHTO T 49	100–200	40–90	100–200	40–90
Ductility, 25 °C, (min, mm)	AASHTO T 51	400	400	400	400
Torsional recovery (min, %)	California Test 332	18	18	18	18
or					
Polymer content at 5% by weight (min, %)	California Test 401	2.5	2.5	2.5	2.5

^aUse 35 ml of 0.02 N CaCl₂ solution.^bUse 35 ml of 0.8% sodium dioctyl sulfosuccinate solution.

94-1.02E Quick-setting Asphaltic Emulsions

Quick-setting asphaltic emulsion must comply with the requirements shown in the following table:

Quick-setting Asphaltic Emulsion Requirements

Quality characteristic	Test method	Requirement			
		Anionic		Cationic	
		Grade QS1	Grade QS1h	Grade CQS1	Grade CQS1h
Saybolt Furol viscosity, @ 50 °C (Saybolt Furol seconds)	AASHTO T 59	15–90	15–90	15–90	15–90
Storage stability test, 1 day (max, %)		1	1	1	1
Sieve test (max, %)		0.30	0.30	0.30	0.30
Particle charge ^a		negative	negative	positive	positive
Residue by distillation (min, %)		57	57	57	57
Tests on residue from distillation test:					
Penetration, 25 °C	AASHTO T 49	100–200	40–90	100–200	40–90
Ductility, 25 °C, (min, mm)	AASHTO T 51	400	400	400	400
Solubility in trichloroethylene (min, %)	AASHTO T 44	97	97	97	97

^aIf the result of the particle charge test is inconclusive, the asphaltic emulsion must be tested for pH under ASTM E70. Grade QS1h asphaltic emulsion must have a minimum pH of 7.3. Grade CQS1h asphaltic emulsion must have a maximum pH of 6.7.

94-1.03 CONSTRUCTION

Not Used

94-1.04 PAYMENT

The quantity of asphaltic emulsion is the weight determined before the addition of any water.

The weight of asphaltic emulsion is determined from volumetric measurements if:

1. Partial loads are used
2. Scale is not available within 20 miles
3. Asphaltic emulsion is delivered in:
 - 3.1. Trucks with each tank calibrated and accompanied by its measuring stick and calibration card
 - 3.2. Trucks equipped with a vehicle tank meter and a calibrated thermometer that determines the asphalt temperature at delivery

For volumetric measurements, the measured volume of asphaltic emulsion is reduced to the volume the material would occupy at 60 degrees F. One ton of asphaltic emulsion at 60 degrees F equals 240 gal. One gallon of asphaltic emulsion at 60 degrees F equals 8.33 lb.

Convert volume to weight using the factors shown in the following table:

Conversion Table

t	M	t	M	t	M	t	M
60	1.00000	83	0.99425	106	0.98850	129	0.98275
61	0.99975	84	0.99400	107	0.98825	130	0.98250
62	0.99950	85	0.99375	108	0.98800	131	0.98225
63	0.99925	86	0.99350	109	0.98775	132	0.98200
64	0.99900	87	0.99325	110	0.98750	133	0.98175
65	0.99875	88	0.99300	111	0.98725	134	0.98150
66	0.99850	89	0.99275	112	0.98700	135	0.98125
67	0.99825	90	0.99250	113	0.98675	136	0.98100
68	0.99800	91	0.99225	114	0.98650	137	0.98075
69	0.99775	92	0.99200	115	0.98625	138	0.98050
70	0.99750	93	0.99175	116	0.98600	139	0.98025
71	0.99725	94	0.99150	117	0.98575	140	0.98000
72	0.99700	95	0.99125	118	0.98550	141	0.97975
73	0.99675	96	0.99100	119	0.98525	142	0.97950
74	0.99650	97	0.99075	120	0.98500	143	0.97925
75	0.99625	98	0.99050	121	0.98475	144	0.97900
76	0.99600	99	0.99025	122	0.98450	145	0.97875
77	0.99575	100	0.99000	123	0.98425	146	0.97850
78	0.99550	101	0.98975	124	0.98400	147	0.97825
79	0.99525	102	0.98950	125	0.98375	148	0.97800
80	0.99500	103	0.98925	126	0.98350	149	0.97775
81	0.99475	104	0.98900	127	0.98325	150	0.97750
82	0.99450	105	0.98875	128	0.98300	151	0.97725

t = observed temperature in degrees F

M = multiplier for reducing volumes to the basis of 60 °F

Replace section 95 with:

95 EPOXY

95-1 GENERAL

95-1.01 GENERAL

95-1.01A Summary

Section 95 includes specifications for mixing and applying epoxy.

95-1.01B Definitions

kit: Two proportioned epoxy components packaged together.

95-1.01C Submittals

Submit a certificate of compliance for epoxy.

95-1.01D Quality Assurance

Reserved

95-1.02 MATERIALS

95-1.02A General

Furnish epoxy as 2 components and mix them together at the job site.

95-1.02B Packaging, Labeling, and Storing

Each epoxy component must be packaged in containers of a size proportional to the amount of that component in the mix so that 1 container of each component is used in mixing 1 batch of epoxy.

The containers must be sealed to prevent leakage and must not react with the components. Each container must be clearly labeled by the epoxy manufacturer with:

1. ASTM C881/C881M class and type
2. Component designation (A or B)
3. Manufacturer's name
4. Manufacture date
5. Batch number
6. Expiration date
7. Directions for use
8. Warnings or precautions required by State and federal laws and regulations

Store epoxy components at temperatures greater than 35 degrees F.

95-1.02C Epoxy Binder

Epoxy binder must be a low-viscosity epoxy formulated primarily for use in:

1. Making HS epoxy concrete and epoxy mortar
2. Pressure grouting cracks in concrete

For load-bearing applications, the epoxy must comply with ASTM C881/C881M, Type IV, Grade 1, Class B or C.

For non-load-bearing applications, the epoxy must comply with ASTM C881/C881M, Type I, Grade 1, Class B or C.

Use Class B whenever the surface temperature is from 40 to 60 degrees F. Use Class C whenever the surface temperature is above 60 degrees F.

If epoxy binder is used for HS epoxy concrete or epoxy mortar, thoroughly mix the components before adding aggregate. The mix proportions must be 1 part epoxy to 4 parts aggregate by volume. Aggregate must be clean and have a moisture content of not more than 0.50 percent when tested under California Test 226.

95-1.02D Epoxy Adhesive for Bonding Freshly Mixed Concrete to Hardened Concrete

Epoxy adhesive for bonding freshly mixed concrete to hardened concrete must comply with ASTM C881/C881M, Type V, Grade 2, Class B or C.

Use Class B whenever the surface temperature is from 40 to 60 degrees F or if a faster cure is required. Use Class C whenever the surface temperature is above 60 degrees F.

95-1.02E Rapid Set Epoxy Adhesive for Pavement Markers

Rapid set epoxy adhesive for bonding pavement markers to concrete and HMA must comply with ASTM C881/C881M, Type IV, Grade 3, Class B or C. The gel time for rapid set epoxy adhesive may be less than 30 minutes.

Use Class B whenever the surface temperature is from 40 to 60 degrees F. Use Class C whenever the surface temperature is above 60 degrees F.

The epoxy adhesive must comply with the requirements shown in the following table:

Rapid Set Epoxy Adhesive For Pavement Markers

Quality characteristic	Test method	Requirement
Gel time (max, minutes, at 77 °F)	California Test 434	30
Bond strength to concrete (minutes, maximum to reach not less than 200 psi)		
at 77 ± 2 °F		35
at 50 ± 2 °F		45
Slant shear strength (min, psi)		
2 days at 77 ± 2 °F		1,000
14 days at 77 ± 2 °F, plus water soak		1,500
Tensile adhesion and cohesion (min, psi)		
Ceramic marker bottom		700
Ceramic marker bottom, including post cure		700
Retroreflective pavement marker bottom		500
Color of mixed epoxy		gray
Glass transition temperature ^a (T _g , minimum)		86 °F

^aBefore testing, samples must be conditioned at 77 °F for 24 hours under ASTM D4065

95-1.02F Standard Set Epoxy Adhesive for Pavement Markers

Standard set epoxy adhesive for bonding pavement markers to concrete and HMA must comply with ASTM C881/C881M, Type IV, Grade 3, Class B or C.

Use Class B whenever the surface temperature is from 40 to 60 degrees F. Use Class C whenever the surface temperature is above 60 degrees F.

The epoxy adhesive must comply with the requirements shown in the following table:

Standard Set Epoxy Adhesive For Pavement Markers

Quality characteristic	Test method	Requirement
Bond strength to concrete (hours, maximum to reach not less than 200 psi)	California Test 434	
at 77 ± 2 °F		3.5
at 55 ± 2 °F		24
Slant shear strength (min, psi)		
2 days at 77 ± 2 °F		1,000
14 days at 77 ± 2 °F, plus water soak		1,500
Tensile adhesion and cohesion (min, psi)		
Ceramic marker bottom		700
Ceramic marker bottom, including post cure		700
Reflective pavement marker bottom		500
Color of mixed components		gray
Glass transition temperature ^a (T _g , minimum)		86 °F

^aBefore testing, samples must be conditioned at 77 °F for 24 hours under ASTM D4065

95-1.02G Epoxy Sealant for Inductive Loops

The epoxy for sealing inductive loops and leads imbedded in HMA and concrete must comply with ASTM C881/C881M, Type I, Grade 2.

The epoxy sealant must comply with the requirements shown in the following table:

Epoxy Sealant for Inductive Loops

Quality characteristic	Test method	Requirement
Tensile strength ^a (min, psi)	California Test 434	400
Elongation ^a (min, %)		90
Shore D hardness ^a (minimum)		45

^aTest on a 0.125-inch-thick cast sheet, cured 18 hours at 77 °F plus 5 hours at 160 °F

95-1.02H Epoxy Resin Adhesive for Pressure Injection Grouting of Concrete Pavement

The epoxy resin adhesive for injection grouting of concrete pavement must comply with the requirements shown in the following table:

Epoxy Resin Adhesive for Injection Grouting of Concrete Pavement

Quality characteristic	Test method	Requirement
Brookfield viscosity, No. 3 spindle at 20 rpm (max, poise, at 77 °F)	California Test 434	9
Gel time (minutes)		2–15
Slant shear strength on dry concrete ^a (min, psi, after 4 days of cure in air at 77 ± 2 °F)		3,000
Slant shear strength on wet concrete ^a (min, psi, after 4 days of cure in air at 77 ± 2 °F)		1,700
Tensile strength (min, psi, after 4 days of cure at 77 ± 2 °F)		4,500
Elongation (max, %, after 4 days of cure at 77 ± 2 °F)		10

^aTest for slant shear strength as follows, except item 1 in the list does not apply for testing on dry concrete:

1. Soak blocks in water for 24 hours at 77 ± 2 °F. Remove and wipe off excess water.
2. Apply a coat of epoxy 0.010-inch-thick to each diagonal surface. Place 4 pieces of shim stock on 1 block to control final film thickness. Shim stock pieces must be 0.12 by 0.125 inch and 0.012 inch thick. Before pressing the coated surfaces together, leave the blocks such that the coated surfaces are horizontal until the epoxy reacts slightly to prevent excessive flow.

95-1.03 CONSTRUCTION

Mix and apply the epoxy under the manufacturer's instructions.

Do not use an epoxy component if any of the following occur:

1. Evidence of crystallization
2. Permanent increase in viscosity too thick to be adequately mixed
3. Settled pigments that cannot be readily dispersed with a paddle
4. Component is older than the manufacturer's recommended expiration date

Thoroughly stir each epoxy component before mixing them together. Do not mix partial kits. Do not add solvents.

Automatic mixing equipment must have positive displacement pumps and be capable of metering a 2-component mix in the specified ratio ± 5 percent by volume of either component.

Mix the 2 epoxy components until no trace of black or white streaks is present in the mixed epoxy.

Clean surfaces to receive the epoxy of rust, paint, grease, asphalt, loose, and deleterious material. Apply the epoxy and place materials to be bonded before the epoxy starts to thicken. Do not use epoxy that has exceeded its working life.

Prime surfaces with epoxy immediately before placing epoxy concrete or mortar.

When bonding freshly-mixed concrete to hardened concrete, coat the blast-cleaned concrete surface with epoxy using a brush or roller. Place freshly-mixed concrete while the epoxy is tacky. Apply new coat of epoxy if the epoxy sets.

95-1.04 PAYMENT

Not Used

95-2-95-8 RESERVED

Replace section 96 with:

96 GEOSYNTHETICS

96-1.01 GENERAL

96-1.01A Summary

Section 96 includes specifications for furnishing geosynthetics.

96-1.01B Definitions

Reserved

96-1.01C Submittals

96-1.01C(1) General

For each type of geosynthetic submit:

1. Certificate of compliance
2. Test sample representing each lot
3. Minimum average roll value

Label submittals with the manufacturer's name and product information.

96-1.01C(2) Geotechnical Subsurface Reinforcement

Submit the LTDS and its supporting calculations at least 15 days before placing geotechnical subsurface reinforcement. The calculations must be signed by an engineer registered as a civil engineer in the State.

96-1.01D Quality Assurance

Geosynthetics must be on the DataMine list for geotextiles and geosynthetics at the National Transportation Product Evaluation Program website. The manufacturing source code must be printed every 5 meters along the edge of the material except for:

1. Paving mat

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2. Paving grid, Class 2 and 3
3. Biaxial geogrid

96-1.02 MATERIALS

96-1.02A General

Treat geosynthetics to resist degradation from exposure to sunlight. Furnish geosynthetics in covers to protect against damage from moisture, sunlight, and shipping and storage.

96-1.02B Filter Fabric

Geosynthetics used for filter fabric must be permeable and nonwoven. Filter fabric must be manufactured from one of the following:

1. Polyester
2. Polypropylene
3. Combined polyester and polypropylene

Filter fabric must comply with the requirements shown in the following table:

Filter Fabric				
Quality characteristic	Test method	Requirement		
		Class A	Class B	Class C
Permittivity, (min, sec ⁻¹)	ASTM D4491	0.5	0.2	0.1
Apparent opening size, average roll value, (max, US standard sieve size)	ASTM D4751	40	60	70
Grab breaking load, 1-inch grip, in each direction, (min, lb)	ASTM D4632	157		
Apparent elongation, in each direction, (min, percent)	ASTM D4632	50		
Puncture strength, (min, lb)	ASTM D6241	310		
Trapezoid tearing strength, (min, lb)	ASTM D4533	56		
UV resistance, retained grab breaking load, 500 hours, (min, percent)	ASTM D4355	70		

96-1.02C Geocomposite Wall Drain

Geocomposite wall drain must consist of a polymeric core with filter fabric integrally bonded to one or both sides of the core creating a stable drainage void.

Filter fabric must comply with section 96-1.02B.

Geocomposite wall drain must be from 0.25 to 2 inches thick.

Geocomposite wall drain must comply with the requirements shown in the following table:

Geocomposite Wall Drain		
Quality characteristic	Test method	Requirement
Transmissivity, (gal/min/ft) gradient = 1.0, Normal stress = 5,000 psf	ASTM D4716	4

96-1.02D Geotechnical Subsurface Reinforcement

96-1.02D(1) General

Geosynthetic reinforcement used for geotechnical subsurface reinforcement must be either geotextile or geogrid.

When tested under ASTM D4491, geotextile permittivity must be at least 0.05 sec⁻¹.

Geogrid must have a regular and defined open area. The open area must be from 50 to 90 percent of the total grid area.

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96-1.02D(2) Long Term Design Strength

Determine the LTDS of geosynthetic reinforcement from the ultimate tensile strength in the primary strength direction divided by reduction factors. Calculate LTDS from the guidelines in Geosynthetic Research Institute Standard Practice GG4a, GRI GG4b, or GRI GT7.

The product of the reduction factors must be at least 1.30. Determine the reduction factor for creep using a 75 year design life for permanent applications. For temporary applications, use a 5 year design life to determine the reduction factor. Determine the installation damage reduction factor from the characteristics of backfill materials used.

If test data is not available, use default values of reduction factors in the Geosynthetic Research Institute Standard Practice to determine LTDS.

96-1.02E Silt Fence Fabric

Silt fence fabric must comply with the requirements shown in the following table:

Silt Fence Fabric

Quality characteristic	Test method	Requirement	
		Woven	Nonwoven
Grab breaking load, 1-inch grip in each direction, (min, lb)	ASTM D4632	120	120
Apparent elongation, in each direction (min, percent)	ASTM D4632	15	50
Water flow rate, average roll value, (min and max, gal per minute/sq ft)	ASTM D4491	10–100	100–150
Permittivity, (min, sec ⁻¹)	ASTM D4491	0.05	1.1
Apparent opening size, average roll value, (max, inches)	ASTM D4751	0.023	0.012
UV resistance, retained grab breaking load, 500 hours, (min, percent)	ASTM D4355	70	70

96-1.02F Gravel-Filled Bag

Gravel-filled bag must comply with the requirements shown in the following table:

Gravel-Filled Bag

Quality characteristic	Test method	Requirement
Grab breaking load, 1-inch grip in each direction, (min, lb)	ASTM D4632	205
Water flow rate, average roll value, (min and max, gal per minute/sq ft)	ASTM D4491	80–150
Permittivity, (min, sec ⁻¹)	ASTM D4491	0.2
Apparent opening size, average roll value, (max, inches)	ASTM D4751	0.016
UV resistance, retained grab breaking load, 500 hours, (min, percent)	ASTM D4355	70

96-1.02G Sediment Filter Bag

The sediment filter bag must comply with the requirements shown in the following table:

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Sediment Filter Bag

Quality characteristic	Test method	Requirement	
		Woven	Nonwoven
Grab breaking load, 1-inch grip in each direction, (min, lb)	ASTM D4632	200	250
Apparent elongation, in each direction, (min, percent)	ASTM D4632	10	50
Water flow rate, average roll value, (min and max, gal per minute/sq ft)	ASTM D4491	100-200	75-200
Permittivity, (min, sec ⁻¹)	ASTM D4491	1.0	1.0
Apparent opening size, average roll value, (max, inches)	ASTM D4751	0.023	0.012
UV resistance, retained grab breaking load, 500 hours, (min, percent)	ASTM D4355	70	70

96-1.02H Temporary Cover

Temporary cover must comply with the requirements shown in the following table:

Temporary Cover

Quality characteristic	Test method	Requirement	
		Woven	Nonwoven
Grab breaking load, 1-inch grip in each direction, (min, lb)	ASTM D4632	200	200
Apparent elongation in each direction, (min, percent)	ASTM D4632	15	50
Water flow rate, average roll value, (min and max, gal per minute/sq ft)	ASTM D4491	4-10	80-120
Permittivity, (min, sec ⁻¹)	ASTM D4491	0.05	1.0
Apparent opening size, average roll value, (max, inches)	ASTM D4751	0.023	0.012
UV resistance, retained grab breaking load, 500 hours, (min, percent)	ASTM D4355	70	70

96-1.02I Rock Slope Protection Fabric

RSP fabric must be a permeable, nonwoven, needle-punched geotextile. The fabric must be manufactured from one of the following:

1. Polyester
2. Polypropylene
3. Combined polyester and polypropylene

Polymers must be either virgin compounds or clean reworked material. Do not subject virgin compounds to use or processing other than required for initial manufacture. Clean reworked material must be previously processed material from the processor's own production that has been reground, pelletized, or solvated. The fabric must not contain more than 20 percent of clean reworked material by weight. Do not use recycled materials from either post-consumer or post-industrial sources.

RSP fabric must comply with the requirements shown in the following table:

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RSP Fabric

Quality characteristic	Test method	Requirement	
		Class 8	Class 10
Mass, (min, oz/sq yd)	ASTM D5261	7.5	9.5
Grab breaking load, 1 inch grip in each direction, (min, lb)	ASTM D4632	200	250
Apparent elongation in each direction, (min, percent)	ASTM D4632	50	50
Permittivity, (min, sec ⁻¹)	ASTM D4491	1.0	0.70
Apparent opening size, (min and max, US Standard sieve size)	ASTM D4751	70–100	70–100
UV resistance, retained grab breaking load, 500 hours, (min, percent)	ASTM D4355	70	70

96-1.02J Paving Fabric

Geosynthetics used for paving fabric must be nonwoven.

Paving fabric must comply with the requirements shown in the following table:

Paving Fabric

Quality characteristic	Test method	Requirement
Mass per unit area, (min, oz/sq yd)	ASTM D5261	4.1
Grab breaking load, 1-inch grip in each direction, (min, lb)	ASTM D4632	100
Apparent elongation in each direction, (min, percent)	ASTM D4632	50
Hydraulic bursting strength, (min, psi)	ASTM D3786	200
Melting point, (min, °F)	ASTM D276	325
Asphalt retention, (min, gal/sq yd)	ASTM D6140	0.2

96-1.02K Paving Mat

Geosynthetics used for paving mat must be a nonwoven fiberglass and polyester hybrid material.

Paving mat must comply with the requirements shown in the following table:

Paving Mat

Quality characteristic	Test method	Requirement
Breaking force, (min, lb/2 inch cut strip)	ASTM D5035	45
Ultimate elongation, (max, percent)	ASTM D5035	5
Mass per unit area, (min, oz/sq yd)	ASTM D5261	3.7
Melting point, (min, °F)	ASTM D276	400
Asphalt retention, (min, gal/sq yd)	ASTM D6140	0.10

96-1.02L Paving Grid

Geosynthetics used for paving grid must be a geopolymer material formed into a grid of integrally connected elements with openings.

Paving grid must comply with the requirements shown in the following table:

APPENDIX A

Paving Grid

Quality characteristic	Test method	Requirement		
		Class I	Class II	Class III
Tensile strength at ultimate, (min, lb/in ^a)	ASTM D6637	560 x 1,120	560	280
Aperture size, (min, inch)	Calipered	0.5	0.5	0.5
Elongation, (max, percent)	ASTM D6637	12	12	12
Mass per area, (min, oz/sq yd)	ASTM D5261	16	10	5.5
Melting point, (min, °F)	ASTM D276	325	325	325

^a For Class I, machine direction x cross direction. For Class II and Class III, both directions.

96-1.02M Paving Geocomposite Grid

Paving geocomposite grid must consist of a paving grid specified in section 96-1.02L bonded or integrated with a paving fabric as specified in section 96-1.02J.

Paving geocomposite grid must have a peel strength of at least 10 lb/ft when tested under ASTM D413.

96-1.02N Geocomposite Strip Membrane

Geocomposite strip membrane must be various widths of strips manufactured from asphaltic rubber and geosynthetics.

Geocomposite strip membrane must comply with the requirements shown in the following table:

Geocomposite Strip Membrane

Quality characteristic	Test method	Requirement
Strip tensile strength, (min, lb/inch)	ASTM D882	50
Elongation at break, (min, percent)	ASTM D882	50
Resistance to puncture, (min, lb)	ASTM E154	200
Permeance, (max, perms)	ASTM E96/E96M	0.10
Pliability, 1/4 inch mandrel with sample conditioned at 25 °F	ASTM D146	No cracks in fabric or bitumen
Melting point, (°F)	ASTM D276	325

96-1.02O Subgrade Enhancement Geotextile

Subgrade enhancement geotextile must be either polyester or polypropylene.

Subgrade enhancement geotextile must comply with the requirements shown in the following table:

APPENDIX A

Subgrade Enhancement Geotextile

Quality characteristic	Test method	Requirement ^a				
		Class A1	Class A2	Class B1	Class B2	Class B3
Elongation at break, (percent)	ASTM D4632	<50	≥50	<50	<50	≥50
Grab breaking load, 1-inch grip in each direction, (min, lb)	ASTM D4632	250	160	--	320	200
Wide width tensile strength at 5 percent strain, (min, lb/ft)	ASTM D4595	--	--	2,000	--	--
Wide width tensile strength at ultimate strength, (min, lb/ft)	ASTM D4595	--	--	4,800	--	--
Tear strength, (min, lb)	ASTM D4533	90	60	--	120	80
Puncture strength, (min, lb)	ASTM D6241	500	310	620	620	430
Permittivity, (min, sec ⁻¹)	ASTM D4491	0.05	0.05	0.20	0.20	0.20
Apparent opening size, (max, inches)	ASTM D4751	0.012	0.012	0.024	0.012	0.012
UV resistance, retained grab breaking load, 500 hours, (min, percent)	ASTM D4355	70	70	70	70	70

^aValues are based on minimum average roll value in the weaker principal direction except apparent opening size is based on maximum average roll value.

96-1.02P Biaxial Geogrid

Geosynthetics used for biaxial geogrid must be a punched and drawn polypropylene material formed into an integrally formed biaxial grid.

Biaxial geogrid must comply with the requirements shown in the following table:

Biaxial Geogrid

Quality characteristic	Test method	Requirement
Aperture size, (min and max, inch) ^a	Calipered	0.8-1.3 x 1.0-1.6
Rib thickness, (min, inch)	Calipered	0.04
Junction thickness, (min, inch)	Calipered	0.150
Tensile strength, 2% strain, (min, lb/ft) ^a	ASTM D6637	410 x 620
Tensile strength at ultimate, (min, lb/ft) ^a	ASTM D6637	1,310 x 1,970
UV resistance, retained tensile strength, 500 hours, (min, percent)	ASTM D4355	100
Junction strength, (min, lb/ft) ^a	ASTM D7737	1,220 x 1,830
Overall flexural rigidity, (min, mg-cm)	ASTM D7748	750,000
Torsional rigidity at 20 cm-kg, (min, mm-kg/deg) ^b	GRI GG9	0.65

^aMachine direction x cross direction

^bGeosynthetic Research Institute, Test Method GG9, Torsional Behavior of Bidirectional Geogrids When Subjected to In-Plane Rotation

96-1.02Q Geosynthetic Bond Breaker

Geosynthetic bond breaker must be nonwoven; needle punched; not heat treated; polypropylene, polyethylene material.

Geosynthetic bond breaker material must comply with the requirements shown in the following table:

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Geosynthetic Bond Breaker

Quality characteristic	Test method	Requirement
Mass per unit area, (min, oz/sq yd)	ASTM D5261	14.7
Thickness at 29 psi, (min, mm)	ASTM D5199	1.0
Tensile strength at ultimate, (min, lb/ft)	ASTM D4595	685
Elongation, (max, percent)	ASTM D4595	130
Permittivity at 2.9 psi, (min, m/s)	ASTM D5493	0.0001
Hydraulic transmissivity at 29 psi, (min, m/s)	ASTM D6574	0.0002
UV resistance, retained grab breaking load, 500 hours, (min, percent)	ASTM D4355	60

96-1.02R Geomembrane

Geomembrane must be:

1. Polyethylene or polypropylene
2. Water resistant
3. Unreinforced or scrim reinforced

Cushion fabric must be nonwoven.

Geomembrane and cushion fabric must comply with the requirements shown in the following tables:

Unreinforced Geomembrane

Quality characteristic	Test method	Requirement		
		Class A	Class B	Class C
Thickness, smooth (min, mil)	ASTM D5199	20	20	20
Thickness, textured (min, mil)	ASTM D5994			
Tensile break strength (min, lb/in)	ASTM D6693 Type IV	75	65	55
Puncture resistance (min, lb)	ASTM D4833	45	40	35
Tear resistance (min, lb)	ASTM D1004	20	15	10
Carbon black content (%)	ASTM D4218	2–3		

Scrim Reinforced Geomembrane

Quality characteristic	Test method	Requirement		
		Class A	Class B	Class C
Thickness, smooth (min, mil)	ASTM D5199	20	20	20
Thickness, textured (min, mil)	ASTM D5994			
Tensile break strength (min, lb)	ASTM D7004	250	200	150
Puncture resistance (min, lb)	ASTM D4833	45	40	35
Tear resistance (min, lb)	ASTM D5884	55	55	55
Ply adhesion (min, lb)	ASTM D6636	20	20	20
Carbon black content (%)	ASTM D4218	2–3		

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Cushion Fabric

Quality characteristic	Test method	Requirement					
		Class 10	Class 12	Class 16	Class 24	Class 32	Class 60
Mass per unit area (oz/sq yd)	ASTM D5261	10	12	16	24	32	60
Grab tensile break strength (min, lb)	ASTM D4632	230	300	370	450	500	630
Grab tensile break elongation (min, %)	ASTM D4632	50					
Puncture strength (min, lb)	ASTM D6241	700	800	900	1100	1700	2400
Trapezoidal tear strength (min, lb)	ASTM D4533	95	115	145	200	215	290
UV resistance (min, %)	ASTM D7238	70					

96-1.02S–96-1.02Y Reserved

96-1.03 CONSTRUCTION

Not Used

96-1.04 PAYMENT

Not Used

INFORMATIONAL HANDOUTS

Information Handout A: Construction Compliance Program



CCP/DBE/ECOP SUBCONTRACTOR SUBSTITUTION/ADDITION REQUEST FORM

Pursuant to the Subletting and Subcontracting Fair Practices Act, Public Contract Code Sections 4100-4114 (the "Sublisting Act"). Prime Contractor shall not substitute any listed subcontractors or add subcontractors not listed in its original bid without prior written approval from the County.

1. Prime Contractor Information

Prime Contractor/Vendor Name: _____ Request Date: ____/____/____

Specification or Contract # _____ Procurement Contract # _____ Prime Contract Value: \$ _____

CCP/DBE GOALS	DBE%		MBE%		WBE%	
ECOP GOALS	LBE%		SLBE%		MBE%	
					WBE%	

Submitted by: _____ Phone: _____ Email: _____

Request for Subcontractor (Choose one): ☐ Addition ☐ Replacement/Substitution

Reason for Substitution/Addition (Select All that Apply)

- ☐ 1. Listed Subcontractor fails or refuses to execute contract based on plans and specifications for the project
- ☐ 2. You stipulated a bond is a condition of executing contract and listed subcontractor fails to meet your bonding requirement
- ☐ 3. Work requires a contractor license and listed subcontractor does not have a valid license under Contractors License Law
- ☐ 4. Listed subcontractor fails or refuses to perform the work or furnish the listed materials
- ☐ 5. Listed subcontractor work is unsatisfactory and not in compliance with the contract
- ☐ 6. Listed subcontractor delays or disrupts the progress of the work
- ☐ 7. Listed subcontractor became bankrupt or insolvent
- ☐ 8. Change order requires addition of subcontractor
- ☐ 9. Other (Explain): _____

Print Contractor Contact Name: _____ Title: _____

Authorized Signature: _____ Date: _____

☐ I agree to register, use and ensure Subcontractor below registers and uses Elation Systems as required by County to report utilization, CPRs, Payments and monitor compliance.

2. Listed or Previously Listed Subcontractor Information (if applicable)

Subcontractor Name: _____ Subcontract Value: \$ _____

Scope of Work (Bid Item): _____ Certification Type: ☐ MBE ☐ WBE ☐ DBE
☐ LBE ☐ SBE

Print Name: _____

Authorized Signature: _____ Date: _____

3. Added/Substituted Subcontractor Information

Business Name: _____ Subcontract Value \$ _____

License #: _____

Certification # (if applicable): _____

Certification Term:

Start Date: ____/____/____

End Date: ____/____/____

Certification Type: ☐ MBE ☐ WBE ☐ DBE ☐ LBE ☐ SBE

Certification Agency: _____

ATTACH COPY OF VALID CERTIFICATION DOCUMENT

Print Name: _____

Authorized Signature: _____ Date: _____

☐ I agree to register and use Elation Systems as required by County to report utilization, CPRs, Payments and monitor compliance.

To be completed by County:

☐ Approved: Contract Compliance Signature _____ Date _____

☐ Approved: Construction Program Mgr. Signature _____ Date _____

Substitution Denied ☐ Reason: _____

☐ BOARD APPROVAL REQUIRED



**ALAMEDA COUNTY PUBLIC WORKS AGENCY (PWA)
CONTRACT COMPLIANCE DIVISION (CCD)
CONSTRUCTION COMPLIANCE PROGRAM (CCP)/DISADVANTAGED BUSINESS
ENTERPRISE (DBE) / ENHANCED CONSTRUCTION OUTREACH PROGRAM
(ECOP) SUBCONTRACTOR SUBSTITUTION/ADDITION REQUEST INSTRUCTIONS**

Prime Contractors must complete and submit Form 101B for approval to the Public Works Agency's (PWA), Contract Compliance Division (CCD) to ensure compliance with County Bid /Contract Specifications and subcontractor substitution requirements in the Subletting and Subcontracting Fair Practices Act, Public Contract Code Sections 4100-4114 (the "Sublisting Act").

Disadvantaged/Minority/Women/Small/Local Business Enterprise (D/M/W/S/LBE) subcontractors added to contracts to meet COP/ECOP goals must be tracked and monitored utilizing the Elation Compliance Systems. Prime Contractors must enter payments made to subcontractors in Elation and ensure that subcontractors confirm payments received per contract terms.

The County Subcontractor Substitution /Addition Request processes works in conjunction with but does not replace or supersede the subcontractor substitution requirements in the Subletting and Subcontracting Fair practices Act, Public Contract Code Sections 4100-4114 (the "Sublisting Act"). Compliance with the Sublisting Act may occur when this process is initiated.

1. Prime Contractors should work closely with Public Works Agency's, Contract Compliance Division when a Subcontractor substitution/addition is needed.
2. If the overall D/M/W/S/LBE participation percentage is being reduced, Board approval may be required to amend the contract terms.
3. Project Manager or designee should work with PWA-CCD to obtain Board approval and to amend contracts when PWA managed the competitive process and/or is monitoring compliance.
4. Project Manager or designee are responsible for ensuring that the
 - a. Contract amendment process is conducted in accordance with State law and County policy.
 - b. Recommended D/M/W/S/LBE Subcontractor substitution/addition is a certified D/M/W/S/LBE through CalTrans (for PWA projects subject to CCP/DBE) or other approved certified agency (for GSA projects subject to ECOP).
 - c. Prime and substituted/added Subcontractor sign and date the Substitution Request Form (101B) and check the box confirming their agreement to use Elation Systems.
 - d. D/M/W/W/S/LBE Substitution/Addition Request form is complete and accurate.
 - e. Form 101B - D/M/W/S/LBE Substitution/Addition Request form(s) are completed and submitted in Elation or sent via email for approval to Lorena Arroyo (lorena@acpwa.org).
5. Upon D/M/W/S/LBE Subcontractor substitution/addition approval, Project Manager or Designee is responsible for ensuring that the following actions are performed in Elation Systems:
 - a. Prime Contractor makes the necessary changes to its project team in a timely manner.
 - b. Pending changes to the project team are reviewed and approved/rejected as needed by department.
 - c. Approved request form(s) and other related contract documents are uploaded to the project by department.

The D/M/W/S/LBE Subcontractor Substitution/Addition Request form is also available online in the Document Center at <http://dsmain.acgov.org/docushare/dsweb/Get/Document-21644/SLEB%20Subcontractor%20Substitution%20Request%20Form%20&%20Instructions%201-17-12.pdf>

PRIME CONTRACTOR

SUBCONTRACTOR INFORMATION

[illegible]

PLEASE BRING THIS COMPLETED FORM TO THE PRE-CONSTRUCTION CONFERENCE



PUBLIC WORKS PAYROLL REPORTING FORM

Page _____ of _____

[illegible]Form A-1-131 (New-2-80)
CCF FORM 103 Rev. 1/2010

S-STRAIT TME
BOTHED - O
SDI - STATE DISABILITY INSURANCE

*03532 Any other deductions, contributions and/or payments whether or not included or required by prevailing wage determinations must be separately listed. Use extra sheet(s) if necessary

CERTIFICATION MUST be completed
(See reverse side)

CCP-18

NOTICE TO PUBLIC ENTITY

For Privacy Considerations

Fold back along dotted line prior to copying for release to general public (private persons).

(Paper Size then 8-1/2 x 11 inches)

I, _____, the undersigned, am the
(Name - print)

_____ with the authority to act for and on behalf of
(Position in business)

_____, certify under penalty of perjury
(Name of business and/or contractor)

that the records or copies thereof submitted and consisting of _____
(Description, number of pages)

are the originals or true, full, and correct copies of the originals which depict the payroll record(s)
of the actual disbursements by way of cash, check, or whatever form to the individual or
individuals named.

Date: _____ Signature: _____

A public entity may require a stricter and/or more extensive form of certification.

LABOR COMMISSIONER, STATE OF CALIFORNIA
 Department of Industrial Relations
 DIVISION OF LABOR STANDARDS ENFORCEMENT
 Bureau of field Enforcement
 2424 Arden Way, Suite 340
 Sacramento, California 95825

Contractor:



PUBLIC WORKS FRINGE BENEFIT STATEMENT

PROJECT NAME/CONTRACT NUMBER			
ADDRESS/LOCATION			
HEALTH AND WELFARE	NAME OF PLAN		CONTRIBUTIONS MADE: ☐ WEEKLY ☐ MONTHLY ☐ QUARTERLY ☐ ANNUALLY
	ADDRESS		
	NAME OF ADMINISTRATOR		
	ADDRESS		
	CLASSIFICATION(S) OF WORKERS	AMOUNT OF CONTRIBUTION PER CLASSIFICATION PER HR	
PENSION	NAME OF PLAN		CONTRIBUTIONS MADE: ☐ WEEKLY ☐ MONTHLY ☐ QUARTERLY ☐ ANNUALLY
	ADDRESS		
	NAME OF ADMINISTRATOR		
	ADDRESS		
	CLASSIFICATION(S) OF WORKERS	AMOUNT OF CONTRIBUTION PER CLASSIFICATION PER HR	

PLEASE COMPLETE THE REVERSE SIDE
 PUBLIC WORKS FRINGE BENEFIT STATEMENT

VACATION/ HOLIDAY	NAME OF PLAN		CONTRIBUTIONS MADE: ☐ WEEKLY ☐ MONTHLY ☐ QUARTERLY ☐ ANNUALLY
	ADDRESS		
	NAME OF ADMINISTRATOR		
	ADDRESS		
	CLASSIFICATION(S) OF WORKERS	AMOUNT OF CONTRIBUTION PER CLASSIFICATION PER HR	
TRAINING	NAME OF PLAN		CONTRIBUTIONS MADE: ☐ WEEKLY ☐ MONTHLY ☐ QUARTERLY ☐ ANNUALLY
	ADDRESS		
	NAME OF ADMINISTRATOR		
	ADDRESS		
	CLASSIFICATION(S) OF WORKERS	AMOUNT OF CONTRIBUTION PER CLASSIFICATION PER HR	
DUES	NAME OF PLAN		CONTRIBUTIONS MADE: ☐ WEEKLY ☐ MONTHLY ☐ QUARTERLY ☐ ANNUALLY
	ADDRESS		
	NAME OF ADMINISTRATOR		
	ADDRESS		
	CLASSIFICATION(S) OF WORKERS	AMOUNT OF CONTRIBUTION PER CLASSIFICATION PER HR	
OTHER	NAME OF PLAN		CONTRIBUTIONS MADE: ☐ WEEKLY ☐ MONTHLY ☐ QUARTERLY ☐ ANNUALLY
	ADDRESS		
	NAME OF ADMINISTRATOR		
	ADDRESS		
	CLASSIFICATION(S) OF WORKERS	AMOUNT OF CONTRIBUTION PER CLASSIFICATION PER HR	

To be completed by
each subcontractor and
prime contractor.

**PREVAILING WAGE INFORMATION SHEET
FOR EACH CLASSIFICATION FOR THIS PROJECT**

County Project No. and Name: _____

Prime or Subcontractor Name: _____

Wage Determination No.: _____

Contractor License No.: _____

Labor Classification (including group #): _____

Base rate: _____

Per Hour

Overtime rate: _____

Per Hour

Check one:

- ☐ This is a federal construction project - overtime is payable at 1 ½ times the base rate for all hours worked over 40 in a work week.
- ☐ This is a state/local construction project; a premium is payable for daily overtime, weekly overtime, Saturday, Sunday & holiday work.

Fringe Benefit Cash Payment: _____

Per Hour

Total Fringe Benefit Plan Contributions: _____

Per Hour

Fringe Benefit contributions are made to:

1. (CAC, JATC, or other Approved Training Program) _____ Per Hour
2. _____
3. _____
4. _____
5. _____

Signature _____

Title _____

Date _____

Telephone No. _____

Fax No. _____

**Return this form with the first certified payroll for the project to
Contract Compliance Office
951 Turner Court, Room 100, Hayward, California 94545**

CONFIDENTIAL		CONTRACT NO.	
This document contains personal information and pursuant to Civil Code Section 1798.21 it shall be kept in order to protect against unauthorized disclosure.		FED. NO.	
1. TO BE FILLED IN BY INTERVIEWER (Data may be obtained from payroll records or during source document review.)			
EMPLOYEE NAME		LABOR CLASSIFICATION	
MINIMUM BASE WAGE PER CONTRACT	BASE RATE	FRINGE BENEFITS	
MINIMUM BASE WAGE PER PAYROLL (if available)	BASE RATE	FRINGE BENEFITS	
EMPLOYER		PRIME CONTRACTOR ON THE PROJECT (if same, so state)	
WORK BEING PERFORMED AT TIME OF INTERVIEW			
2. QUESTIONS TO BE ASKED OF EMPLOYEE			
A. HOW LONG HAVE YOU WORKED FOR YOUR PRESENT EMPLOYER?		HOW LONG ON THIS PROJECT?	
B. DESCRIBE THE TYPE OF WORK YOU HAVE BEEN DOING THIS PAST WEEK			
C. WHAT IS YOUR WAGE (Include Base Rate and Fringe Benefits (Compare to payroll))		DO YOU KEEP A RECORD OF THE HOURS YOU WORK? ☐ YES ☐ NO	
D. DO YOU WORK OVERTIME: ☐ FREQUENTLY ☐ SELDOM ☐ NONE	ARE YOU PAID TIME AND A HALF FOR OVERTIME ☐ YES ☐ NO	IF NO, EXPLAIN	
E. HAS YOUR EMPLOYER DIRECTED YOUR ATTENTION TO THE REQUIRED WAGE RATE POSTERS ON THE PROJECT? ☐ YES ☐ NO		HAVE YOU SEEN THOSE POSTERS? IF NO, EXPLAIN ☐ YES ☐ NO	
F. ARE YOU AWARE OF THE CONTRACTORS EEO POLICIES? ☐ YES ☐ NO		DOES THE CONTRACTOR HOLD REGULAR EEO MEETINGS? ☐ YES ☐ NO HOW OFTEN?	
WHO CONDUCTS THE MEETINGS? WHO IS THE EEO OFFICER FOR THIS PROJECT?		WHO IS THE EEO OFFICER FOR YOUR EMPLOYER?	
G. ARE YOU INTERESTED IN, OR HAS YOUR EMPLOYER INFORMED YOU OF UPGRADING AND TRAINING POSSIBILITIES? ☐ YES ☐ NO IF YES,, PLEASE EXPLAIN			
3. ADDITIONAL QUESTIONS FOR OWNER OPERATORS			
A. EQUIPMENT DESCRIPTION		TRUCK LICENSE NO.	TRUCK (CAL-T-NO.)
HOURLY RATE (fully operated and maintained?)		BASE EQUIPMENT RATE	ON WHAT DO YOU BASE YOUR EQUIPMENT RENTAL RATE? ☐ hr'ly ☐ wk'ly ☐ mo'ly
B. DO YOU OWN THE EQUIPMENT? ☐ YES ☐ NO		MAY I SEE YOUR CERTIFICATE OF OWNERSHIP? ☐ YES (Interviewer note response) ☐ NO	
LEGAL OWNER		REGISTERED OWNER	
4. EMPLOYEE COMMENTS DO YOU HAVE ANY COMMENTS OR COMPLAINTS ABOUT WAGES OR EEO POLICIES? BE SPECIFIC		5. INTERVIEWERS COMMENTS	
INTERVIEWER'S SIGNATURE DATE		RESIDENT ENGINEER'S SIGNATURE DATE	

EMPLOYEE INTERVIEW: LABOR COMPLIANCE / EEO
HC-0031 (BACK)

Fill in Section 1 from payroll records, if available, after interview.

Fill in Section 2 completely (does not apply to owner operators).

Fill in Section 3 completely.

Employee comments optional in Section 4.

Interviewer comments on findings recommends further actions to be taken.

Attach additional sheets if necessary.

EMPLOYEE INTERVIEW: LABOR COMPLIANCE / EEO
HC-0031 (Back)

DIRECTIONS TO INTERVIEWER

1. Fill in Section 1 from payroll records, if available, after interview.
2. Fill in Section 2 completely. (does not apply to owner operators)
3. Fill in Section 3 completely
4. Employee comments optional in Section 4.
5. Interviewer comments on findings recommends further actions to be taken.
6. Attach additional sheets if necessary

[illegible]

*If actual MWBE utilization (or item or work) was different than that approved at time of award, explain why (i.e., change order, quantities different, etc.). Use reverse side if additional space is required.

I certify that the above information is complete and correct.

Signature-Inspector/Project Manager	Date Forwarded to CCO	Contractor Representative	Title
		Phone Number	Date

PROJECT NO.: _____
 PROJECT NAME: _____
 COMPLETION DATE OF YOUR PORTION: _____
 PRIME CONTRACTOR: _____
 YOUR COMPANY NAME: _____
 ADDRESS: _____
 ORIGINAL SUBCONTRACT AMOUNT: \$ _____

CONTRACT ITEM NO.	DESCRIPTION OF WORK PERFORMED AND/OR MATERIALS PROVIDED	NAME OF MW/BE	CONTRACT PAYMENTS		COMMENTS *
			PAID TO DATE	PAYMENT DUE	

*If actual MWBE utilization (or item or work) was different than that approved at time of award, explain why (i.e., change order, quantities different, etc.). Use reverse side if additional space is required.

To the best of my information and belief, the above information is complete and correct.

I certify that the above information is complete and correct.

Signature-Inspector/Project Manager
Date Forwarded to CCO
Phone Number
Contractor Representative
Title
Date

Rev. 6/09

CCP-27

CCP-FORM 106A

PRIME CONTRACTOR

SUBCONTRACTOR

ALAMEDA COUNTY PROJECT NO.

COUNTY OF ALAMEDA
EQUAL EMPLOYMENT POLICY
THIS COMPANY IS AN EQUAL OPPORTUNITY EMPLOYER

We participate in the Construction Compliance Program of the County of Alameda and accept the following operating policy:

"It is the policy of this Company to assure that applicants are employed and that employees are treated during employment without regard to their race, color, religion, sex, national origin, disability, veteran status, physical or mental handicap; such action shall include, but not be limited to the following; employment, upgrading, demotion, or transfer; recruitment or of preapprenticeship training and on-the-job training."

This Company subscribes to the Construction Compliance Program of the County of Alameda, particulars of which are in the Construction Compliance Program Section of the Project Specifications.

DATE: _____

CONTRACTOR NAME: _____

TITLE: _____

SIGNATURE: _____

Report of Utilization of Subcontractors

County of Alameda
Public Works Agency

REPORT ON UTILIZATION OF SUBCONTRACTORS

Location: _____ Prime Contractor: _____
 Project/Specification No.: _____ Address: _____
 Administering Agency: _____
 Month Ending: _____ Total Payment to Subcontractors \$ _____

CONTRACT ITEM NO.	DESCRIPTION OF WORK PERFORMED AND MATERIALS PROVIDED	NAME OF SUBCONTRACTOR	AMOUNT OF PAYMENT	COMMENTS
1				
2				
3				

If actual subcontractor utilization (or item of work) was different from that approved at time of award, explain why under comments. List all subcontractors utilized, whether or not the firms were originally listed in bid documents.

Total

\$

ORIGINAL COMMITMENT

M/DBE: \$ _____ %
 WBE: \$ _____ %
 TOTAL: \$ _____ %

(Use reverse side if additional space is required.)

I CERTIFY THAT THE ABOVE INFORMATION IS COMPLETE AND CORRECT.

Signature -- Contractor Representative

Title

Phone Number

Date

TO THE BEST OF MY INFORMATION AND BELIEF, THE ABOVE INFORMATION IS COMPLETE AND CORRECT.

Signature -- Public Works Inspector

Name (Please Print)

Phone Number

Date

GOVERNMENT CODE SECTION 12950(a) REQUIRES ALL EMPLOYERS TO POST THIS DOCUMENT

STATE OF CALIFORNIA

DEPARTMENT OF FAIR EMPLOYMENT AND HOUSING

HARASSMENT OR DISCRIMINATION IN EMPLOYMENT

Because Of

**Sex Race Color Ancestry Religious Creed
National Origin Disability (Including HIV and Aids)
Medical Condition (Cancer) Age
Marital Status Denial of Family and Medical Care Leave
Denial of Pregnancy Disability Leave
IS PROHIBITED BY LAW**

The California Fair Employment and Housing Act

(Part 2.8 (commencing with Section 12900) of Div. 3 of Title 2 of the Government Code)

- prohibits harassment of employees or applicants and requires employers to take all reasonable steps to prevent harassment. The prohibition against sex harassment includes a prohibition against sexual harassment, gender harassment, and harassment based on pregnancy, childbirth, or related medical conditions.
- requires that all employers provide information to each of their employees on the nature, illegality and legal remedies which apply to sexual harassment. Employers may either develop their own publication, which must meet standards as set forth in California Government Code Section 12950, or use a brochure which may be obtained from the Department of Fair Employment and Housing.
- requires employers to reasonably accommodate disabled employees or job applicants in order to enable them to perform the essential functions of a job.
- permits job applicants and employees to file complaints with the Department of Fair Employment and Housing (DFEH) against an employer, employment agency, or labor union which fails to grant equal employment as required by law.
- requires employers not to discriminate against any job applicant or worker in hiring, promotions, assignments, or discharge. On-the-job segregation is also prohibited, and employers may file complaints against workers who refuse to cooperate in compliance.
- requires employers, employment agencies, and unions to preserve applications, personnel and employment referral records for a minimum of two years.
- requires employers to provide leaves of up to four months to employees disabled because of pregnancy, maternity, or childbirth.
- requires employers of 50 or more persons to allow employees to take up to 12 weeks leave in any 12 month period for the birth of a child, the placement of a child for adoption or foster care, for an employee's own serious health condition, or to care for a parent, spouse or child with a serious health condition.
- requires employment agencies to serve all applicants equally; to refuse discriminatory job orders; to refrain from prohibited pre-hiring inquiries or help-wanted advertising.
- requires unions not to discriminate in member admission or dispatching to jobs.
- forbids any person to interfere with efforts to comply with the act. Authorizes the DFEH to work affirmatively with cooperating employers to review hiring and recruiting practices in order to expand equal opportunity.

REMEDIES FOR INDIVIDUALS, OR PENALTIES FOR VIOLATION MAY INCLUDE:

hiring, back pay, promotion, reinstatement, damages for emotional distress, cease-and-desist order, or a fine of up to \$50,000.

JOB APPLICANTS AND EMPLOYEES: If you believe you have experienced discrimination, DFEH will investigate without cost to you.

For information contact the Department of Fair Employment and Housing:

Toll Free 1-800-884-1684

TDD Numbers: Los Angeles (213) 897-2840, Sacramento (916) 324-1678

This notice must be conspicuously posted in hiring offices, on employee bulletin boards, in employment agency waiting rooms, union halls, etc. For a copy, contact the nearest DFEH office.

APPENDIX B

Information Handout B: PS/CBA Letter of Assent

Reference: Section [3-1.09](#) Project Stabilization/Community Benefits

<https://www.acpwa.org/s/AC-Project-Stabilization-Community-Benefits-Agreement.pdf>

APPENDIX B

PROJECT STABILATION/COMMUNITY BENEFITS AGREEMENT

for the
COUNTY OF ALAMEDA

"LETTER OF ASSENT"

The undersigned, as a Contractor or Subcontractor (CONTRACTOR) on the County of Alameda **Roadway Improvements at the Intersection of Villareal Drive and Greenville Place** (hereinafter PROJECT), for and in consideration of the award to it of a contract to perform work on said PROJECT, and in further consideration of the mutual promises made in the "Project Stabilization/Community Benefits Agreement for the County of Alameda Project" (hereinafter AGREEMENT), a copy of which was received and is acknowledged, hereby:

- (1) Accepts and agrees to be bound by the terms and conditions of the AGREEMENT, together with any and all amendments and supplements now existing or which are later made thereto
- (2) The CONTRACTOR agrees to be bound by the legally established local trust agreements as set forth in Article 14 of this AGREEMENT
- (3) The CONTRACTOR authorizes the parties to such local trust agreements to appoint trustees and successor trustees to administer the trust funds and hereby ratifies and accepts the trustees so appointed as if made by the CONTRACTOR
- (4) Certifies that it has no commitments or agreements which would preclude its full and complete compliance with the terms and conditions of said AGREEMENT
- (5) Agrees to secure from any CONTRACTORS (as defined in said AGREEMENT) which is or becomes a Subcontractor (of any tier) to it, a duly executed Letter of Assent in form identical to this document.

Date

Name of Contractor

Name of Prime Contractor

Authorized Officer & Title

CA Contractor License No.

Signature

Spec No.

Address

Phone

e-mail

APPENDIX C

Information Handout C: Survey Corner Record Form

Reference: Section [5-1.36D](#) Survey Monuments

NOT USED

APPENDIX D

Information Handout D: Notice to Residents

Reference: Section [7-1.03](#) Public Convenience

Not Used

APPENDIX E

Information Handout E: Stormwater Best Management Status Form

Reference: Section [13-1.03C](#) Water Pollution Control Inspections

ALAMEDA COUNTY STORMWATER CONSTRUCTION SITE INSPECTION REPORT

Construction General Permit Order No. 2009-0009 DWQ

☐ Alameda County Public Works Agency ☐ Alameda County Flood Control and Water Conservation District

CEM-2030 (NEW 1/28/2011)

Page 1 of 20

PROJECT INFORMATION NAME , SITE ADDRESS, AND LAT/LONG	CONTRACT NUMBER/CO/RTE/PM	
	PROJECT IDENTIFIER NUMBER	
	WDID NUMBER	
CONTRACTOR NAME AND ADDRESS	PROJECT SITE RISK LEVEL ☐ Risk Level 1 ☐ Risk Level 2 ☐ Risk Level 3	
Submitted by contractor	Signature	Date
Water pollution control manager name and company name	Phone number	
	Emergency (24/7) phone number	
Inspector's Name (QSD/QSP/OR APPOINTEE)		Date of Inspection

General Information

Weather Condition ☐ Clear ☐ Partly Cloudy ☐ Cloudy	Precipitation Condition ☐ Misty ☐ Light Rain ☐ Rain ☐ Heavy Rain ☐ Hail ☐ Snow	Wind Condition ☐ None ☐ Less than 5 mph ☐ Greater than 5 mph
Construction Phase ☐ Road Construction ☐ Plant Establishment ☐ Suspension of Work (Inactive Site) ☐ Flood Construction ☐ Other _____ Type of Project _____		Site Information _____ Acres total project area _____ Acres total project disturbed soil area _____ Acres current phase disturbed soil area _____ Acres current phase inactive disturbed soil

Inspection Type Check Appropriate Box	Storm Information	
☐ Weekly ☐ Quarterly Non-Stormwater	Time elapsed since last storm _____ days	Precipitation amount from last storm _____ inches
☐ Pre-Storm	Time storm is expected (time) _____ (date) _____	Expected precipitation amount _____ inches
☐ During Storm Event	Time elapsed since storm began _____ hours-minutes	Precipitation amount from storm recorded from site rain gauge _____ inches
☐ Post Storm	Time elapsed since storm _____ hours-minutes	Precipitation amount from storm recorded from site rain gauge _____ inches

ALAMEDA COUNTY STORMWATER CONSTRUCTION SITE INSPECTION REPORT

CEM-2030 (NEW 1/28/2011)

Page 2 of 20

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

Site Inspection of Best Management Practices

If the inspection form does not contain enough lines for all locations, attach more pages for the BMP so that all locations are inspected and reported.

Preservation of Existing Vegetation ☐ Yes ☐ No	Right location?		Properly installed?		Maintenance or repair necessary?		Photos?	Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No	Yes		
Location									
Location									
Location									
Location									
Location									

Temporary Soil Stabilization ☐ Yes ☐ No	Inactive areas covered?		100% coverage of required areas?		Stabilized areas free from visible erosion?		Photos?	Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No	Yes		
Location									
Location									
Location									
Location									
Location									
Location									
Location									
Location									
Location									
Location									

ALAMEDA COUNTY STORMWATER CONSTRUCTION SITE INSPECTION REPORT

CEM-2030 (NEW 1/28/2011)

Page 3 of 20

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

Site Inspection of Best Management Practices, Continued

Temporary Linear Sediment Barriers ☐ Yes ☐ No	Right location?		Properly installed or cross barriers installed?		Maintenance performed when 1/3 height or repair needed?		Photos?	Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No	Yes		
Location									
Location									
Location									
Location									
Location									
Location									
Location									
Location									

Storm Drain Inlet Protection ☐ Yes ☐ No	All inlets protected?		Properly installed?		Maintenance or repair needed?		Photos?	Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No	Yes		
Location									
Location									
Location									
Location									
Location									
Location									
Location									
Location									
Location									

ALAMEDA COUNTY STORMWATER CONSTRUCTION SITE INSPECTION REPORT

CEM-2030 (NEW 1/28/2011)

Page 4 of 20

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

Site Inspection of Best Management Practices, Continued

Sediment and Desilting Basins ☐ Yes ☐ No	Basin inlets, outlets, and spillways in working order?		Is water contained in basin?		Maintenance required to provide retention or detention?		Photos?	Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No			
Location									
Location									
Location									
Location									
Location									

Stockpile Management ☐ Yes ☐ No	Properly located?		Properly covered and perimeter control installed?		Maintenance or repair needed?		Photos?	Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No			
Location									
Location									
Location									
Location									
Location									
Location									
Location									
Location									
Location									
Location									

ALAMEDA COUNTY STORMWATER CONSTRUCTION SITE INSPECTION REPORT

CEM-2030 (NEW 1/28/2011)

Page 5 of 20

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

Site Inspection of Best Management Practices, Continued

Tracking Controls ☐ Yes ☐ No	Do all entrances and exits have tracking controls?		Pavement free from visible sediment tacking?		Is street sweeping needed at the site?		Does sediment need to be removed from rock or ribbed plates?		Photos?	Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No	Yes	No	Yes		
Location											
Location											
Location											
Location											
Location											
Location											
Location											
Location											
Location											

Wind Erosion Control ☐ Yes ☐ No	Water trucks onsite?				Visible dust?		Photos?	Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No	Yes		
Location									
Location									
Location									
Location									
Location									
Location									
Location									
Location									

ALAMEDA COUNTY STORMWATER CONSTRUCTION SITE INSPECTION REPORT

CEM-2030 (NEW 1/28/2011)

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PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

Site Inspection of Best Management Practices, Continued

Dewatering Operations ☐ Yes ☐ No	Dewatering currently active?		Dewatering conform to 401, 404, and 1601 Permit Requirements?		Dewatering discharge within discharge specified limitations?		Photos?	Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No	Yes		
Location									
Location									
Location									
Location									
Location									
Location									

Temporary Stream Crossing ☐ Yes ☐ No	Constructed as shown on the plans?		Conforms to 404 Permit and 1601 Permit requirements?		Maintenance or repair required?		Photos?	Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No	Yes		
Location									
Location									
Location									
Location									
Location									
Location									

ALAMEDA COUNTY STORMWATER CONSTRUCTION SITE INSPECTION REPORT

CEM-2030 (NEW 1/28/2011)

Page 7 of 20

PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

Site Inspection of Best Management Practices, Continued

Vehicle and Equipment Fueling and Maintenance ☐ Yes ☐ No	Located away from drainage courses and water courses?		Areas protected from run on and runoff?		Performed on impermeable surface and berm? If no, drip pans used?		Areas reasonably clean and free of spills, leaks, and other material?		Vehicles and equipment inspected daily for leaks? Repair if necessary?		Photos?
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Location 1											
Location 2											
Location 3											

Comments and Required Actions											Action No.
Location 1											
Location 2											
Location 3											

Vehicle and Equipment Cleaning ☐ Yes ☐ No	Washing areas located away from drainage courses and water courses?		Washing areas protected from run-on and runoff?		Washing performed on impermeable surface and berm?		Washing areas reasonably clean and free of spills, leaks, and other material?		Washing limited to water, no soap? Wash water contained for infiltration and evaporation on disposal		Photos?
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Location 1											
Location 2											

Comments and Required Actions											Action No.
Location 1											
Location 2											

ALAMEDA COUNTY STORMWATER CONSTRUCTION SITE INSPECTION REPORT

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PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

Site Inspection of Best Management Practices, Continued

Material Storage ☐ Yes ☐ No	Located away from drainage courses and water courses?		Areas protected from run on and runoff?		Bagged and boxed materials stored on pallets? Liquid materials in secondary containment?		Areas reasonably clean and free of spills, leaks, and other material?		Is material inventory up to date?		Photos?
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Location 1											
Location 2											
Location 3											
Location 4											

Comments and Required Actions

Location 1		Action No.
Location 2		
Location 3		
Location 4		

Additional Requirements for Hazardous

Material Storage

☐ Yes ☐ No

Additional Requirements for Hazardous Material Storage ☐ Yes ☐ No	Stored in properly labeled containers?		Liquids have secondary containment?		Secondary containment facilities free from spills and rainwater?		Cleanup and spill reporting procedures posted?		Cleanup supplies available and adequate for minor spills?		Photos?
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Location 1											
Location 2											

Comments and Required Actions

Location 1		Action No.
Location 2		

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PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
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Site Inspection of Best Management Practices, Continued

Waste Management ☐ Yes ☐ No	Are watertight litter containers and dumpsters properly located?		Are litter and material waste placed in watertight dumpsters?		Do waste management containers have enough capacity for planned operations?		Photos?	Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No	Yes		
Location									
Location									
Location									
Location									
Portable Toilets ☐ Yes ☐ No	Properly located?		Proper perimeter control installed?		Maintenance or repair needed?		Photos?	Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No	Yes		
Location									
Location									
Concrete Waste Management ☐ Yes ☐ No	Are washout facilities functional and identified?		Are concrete washout liners free from punctures and holes?		Is there enough volume and freeboard for planned operations?		Photos?	Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No	Yes		
Location									
Location									
Location									
Location									
Location									
Location									
Location									
Location									
Location									

ALAMEDA COUNTY STORMWATER CONSTRUCTION SITE INSPECTION REPORT

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PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

Site Inspection of Best Management Practices, Continued

For project specific BMPs, insert the BMP name and additional inspection requirements below.

Project-Specific BMP ☐ Yes ☐ No	Properly located?		Properly installed?		Maintenance or repair needed?		Photos?	Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No	Yes		
Location									
Location									
Location									
Location									

Project-Specific BMP ☐ Yes ☐ No	Properly located?		Properly installed?		Maintenance repair needed?						Photos?
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
Location 1											
Location 2											
Location 3											
Location 4											

Comments and Required Actions	Action No.
Location 1	
Location 2	
Location 3	
Location 4	

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PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
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Pre-Storm Visual Inspection Requirements

Inspect the following in addition to visual inspection of BMPs to see if they have been properly implemented in accordance with SWPP and REAP.

Drainage Areas	Leaks or spills?		Any uncontrolled pollutant sources?		Stored materials that should be moved?		Photos?	Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No	Yes		
Location 1									
Location 2									
Location 3									
Location 4									
Drainage Discharge Locations	Free of erosion or sediment?						Photos?	Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No	Yes		
Location 1									
Location 2									
Location 3									
Location 4									
Desilting Basins and Other Stormwater Storage ☐ Yes ☐ No	Water retained or stored?		Leaks?		Adequate freeboard for storm event?		Photos?	Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No	Yes		
Location 1									
Location 2									
Desilting Basins and other Stormwater Storage <i>If any water is retained or stored, report the following:</i>	Presence of floating and suspended materials?		Presence of discoloration or turbidity?		Presence of odors?		If yes to observed pollutants, was sample taken?		Identify source of any observed pollutants
	Yes	No	Yes	No	Yes	No	Yes	No	
Location 1									
Location 2									

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PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
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During Storm Visual Inspection Requirements

In addition to visual inspection of BMPs to determine whether they are performing and are adequate, if additional BMPs are needed, or if BMPs need immediate maintenance, inspect the following:

Drainage Discharge Locations	Flowing water?		Free of erosion or sediment?		Discharge sample taken?		Run-on sample taken?		Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No	Yes	No		
Location 1										
Location 2										
Location 3										
Location 4										
Location 5										

Drainage Discharge Locations <i>If any water is flowing, report the following:</i>	Presence of floating and suspended materials?		Presence of discoloration or turbidity?		Presence of odors?		If yes to observed pollutant, was sample taken?		Source of Observed Pollutants
	Yes	No	Yes	No	Yes	No	Yes	No	
Location 1									
Location 2									
Location 3									
Location 4									
Location 5									

Risk Level 3 Drainage Discharge Locations <i>If any water is flowing, report the following:</i>	Run-on sample taken?		Upstream or un-gradient receiving water sample taken?		Downstream or downgradient receiving water sample taken?		Comments and Required Actions
	Yes	No	Yes	No	Yes	No	
Location							
Location							
Location							
Location							

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PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
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	WDID NUMBER

During Storm Visual Inspection Requirements, Continued

Desilting Basins and Other Stormwater Storage ☐ Yes ☐ No	Flowing water?		Free of erosion or sediment?		Discharge sample taken?		Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No		
Location 1								
Location 2								
Location 3								

Desilting Basins and Other Stormwater Storage <i>If any water is retained or stored, report the following:</i>	Presence of floating and suspended materials?		Presence of discoloration or turbidity?		Presence of odors?		If yes to observed pollutant, was sample taken?		Source of Observed Pollutants
	Yes	No	Yes	No	Yes	No	Yes	No	
Location 1									
Location 2									
Location 3									

Non-Visible Pollutant Locations ☐ Yes ☐ No <i>Inspect locations where disturbed soil or materials are stored or used on sites that contain non-visible pollutants.</i>	Breath malfunction leakage or spill?		Run-on?		Flowing discharge?		Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No		
Location 1								
Location 2								
Location 3								

Desilting Basins and Other Stormwater Storage <i>If any water is retained or stored, report the following:</i>	Presence of floating and suspended materials?		Presence of discoloration or turbidity?		Presence of odors?		Discharge sample taken?		Uncontaminated* sample taken?	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Location 1										
Location 2										
Location 3										

* Sample stormwater that has not come in contact with disturbed soil or stored materials or where materials were used on-site for comparison with contaminated sample.

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PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
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Post Storm Visual Inspection Requirements

Within 48 hours of a qualifying rain event, inspect all BMPs to determine whether BMPs were adequate, implemented and effective and identify any additional BMPs needed.

Perform the following visual inspections of the project site

Drainage Discharge Locations	Flowing water?		Free of erosion or sediment?		Discharge sample taken?		Run-on sample taken?		Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No	Yes	No		
Location 1										
Location 2										
Location 3										
Location 4										
Location 5										

Drainage Discharge Locations If any water is flowing, report the following:	Presence of floating and suspended materials?		Presence of discoloration or turbidity?		Presence of odors?		If yes to observed pollutants, was sample taken?	Source of Observed Pollutants
	Yes	No	Yes	No	Yes	No		
Location 1								
Location 2								
Location 3								
Location 4								
Location 5								

Risk Level 3 Drainage Discharge Locations If any water is flowing, report the following:	Run-on sample taken?		Upstream or un-gradient receiving water sample taken?		Downstream or downgradient receiving water sample taken?		Comments
	Yes	No	Yes	No	Yes	No	
Location							
Location							
Location							

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PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

Post Storm Visual Inspection Requirements, Continued

Desilting Basins and Other Stormwater Storage ☐ Yes ☐ No	Water retained or stored?		Leaks?				Photos?	Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No	Yes		
Location 1									
Location 2									
Location 3									

Desilting Basins and Other Stormwater Storage <i>If any water is retained or stored, report the following:</i>	Presence of floating and suspended materials?		Presence of discoloration or turbidity?		Presence of odors?		If yes to observed pollutants, was sample taken?		Source of Observed Pollutants
	Yes	No	Yes	No	Yes	No	Yes	No	
Location 1									
Location 2									
Location 3									

Non-Visible Pollutant Locations ☐ Yes ☐ No <i>Inspect all locations where disturbed soil or materials are stored or used on sites that contain non-visible pollutants.</i>	Breath malfunction, leakage or spill?		Run-on?		Flowing discharge?		Photos?	Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No	Yes		
Location 1									
Location 2									
Location 3									

Non-Visible Pollutant Locations <i>If any water is flowing, report the following:</i>	Presence of floating and suspended materials?		Presence of discoloration or turbidity?		Presence of odors?		Discharge sample taken?		Uncontaminated* sample taken?	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Location 1										
Location 2										
Location 3										

* Sample stormwater that has not come in contact with disturbed soil or stored materials or where materials were used on-site for comparison with contaminated sample.

ALAMEDA COUNTY STORMWATER CONSTRUCTION SITE INSPECTION REPORT

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PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
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Quarterly Non-Stormwater Discharge Visual Inspection Requirements

Conduct one visual inspection quarterly in each of the following periods: January-March, April-June, July-September, and October-December.

Drainage Areas	Presence of a non-stormwater discharge?		Indication of a prior non-stormwater discharge?		Date discharge was observed?		Photos?	Source of non-stormwater discharge and required actions	Action No.
	Yes	No	Yes	No	Yes	No	Yes		
Location 1									
Location 2									
Location 3									
Location 4									
Location 5									

Drainage Areas <i>If any water is retained or stored, report the following:</i>	Presence of floating and suspended materials?		Presence of discoloration or turbidity?		Presence of odors?		Sample taken?		Comments and Required Actions	Action No.
	Yes	No	Yes	No	Yes	No	Yes	No		
Location 1										
Location 2										
Location 3										
Location 4										
Location 5										

** Sample non-stormwater discharge at the location where the discharge leaves the jobsite and record location under drainage discharge locations.*

Drainage Discharge Locations	Presence of a non-stormwater discharge?		Indication of a prior non-stormwater discharge?		Date discharge was observed?	Photos?	Source of non-stormwater discharge and required actions	Action No.
	Yes	No	Yes	No		Yes		
Location 1								
Location 2								
Location 3								
Location 4								
Location 5								

ALAMEDA COUNTY STORMWATER CONSTRUCTION SITE INSPECTION REPORT

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PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

Quarterly Non-Stormwater Discharge Visual Inspection Requirements, Continued

Drainage Discharge Locations <i>If any water is flowing, report the following:</i>	Presence of floating and suspended materials?		Presence of discoloration or turbidity?		Presence of odors?		Discharge sample taken?		Run-on sample taken?		Photos?	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	
Location 1												
Location 2												
Location 3												
Location 4												
Location 5												

Risk Level 3 Drainage Discharge Locations <i>If any water is flowing, report the following:</i>			Upstream or un-gradient receiving water sample taken?		Downstream or downgradient receiving water sample taken?		Comments
	Yes	No	Yes	No	Yes	No	
Location							
Location							
Location							
Location							
Location							

Illegal Connection or Discharge Detection <i>Observe the jobsite and jobsite perimeter for illegal connections and discharges.</i>	Evidence of illegal connections?		Illegal dumping or discharges onto jobsite?		Engineer notified of illegal connection or discharge?	Photos?	Comments and Required Actions	Action No.
	Yes	No	Yes	No		Yes		
Location								
Location								
Location								
Location								
Location								

ALAMEDA COUNTY STORMWATER CONSTRUCTION SITE INSPECTION REPORT

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PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

Site Inspection Report General Comments

Are the BMPs installed as required by the SWPPP for the phase of construction?

☐ Yes ☐ No

Does the SWPPP need to be amended?

☐ Yes ☐ No

Does the SWPPP currently reflect the current site conditions and contractor operations?

☐ Yes ☐ No

Are there water pollution control concerns on the project site not addressed by the comments / required actions shown above for BMPs based on the field review of the jobsite?

☐ Yes ☐ No *If yes, provide below details and comments and required actions for each location.*

[illegible]

ALAMEDA COUNTY STORMWATER CONSTRUCTION SITE INSPECTION REPORT

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PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

Stormwater Inspection Report Certification

I certify under penalty of law that this Stormwater Inspection Report was performed in accordance with the General Permit. The information contained in this inspection report was gathered from a field site inspection. I am aware that Section 309 (c)(4) of the Clean Water Act provides for significant penalties, including fines and imprisonment for knowingly submitting false material statement, representation or certification.

Stormwater Inspector Name (Contractor's QSD/QSP/or Appointee)	Date Report Completed
Stormwater Inspector Signature	

I certify under penalty of law that this Stormwater Inspection Report was performed in accordance with the General Permit by me or under my direction or supervision. The information contained in this inspection report was gathered and evaluated by qualified personnel prior to submittal. Based on my review of the information and inquiry of those who gathered and evaluated the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

I am aware that Section 309 (c)(4) of the Clean Water Act provides for significant penalties, including fines and imprisonment for knowingly submitting false material statement, representation, or certification.

Water Pollution Control Manager Name	Date
Water Pollution Control Manager Signature	

Stormwater Inspection Report Acceptance

Accepted by Resident Engineer (Name)	Date
Resident Engineer Signature	

For Information Only

ALAMEDA COUNTY STORMWATER CONSTRUCTION SITE INSPECTION REPORT

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General Information

- If the inspection form does not contain enough lines to report all locations on a jobsite, attach additional copies of the form page so that all locations are inspected and reported.
 - Obtain forecasted precipitation information from the National Weather Service Forecast Office website, <http://www.srh.noaa.gov/forcast>.
- Weather information should be the best estimate of beginning of the storm event, duration of the event, and time elapsed since the last storm.
 - Rainfall amounts should be recorded from the project site rain gauge.

Storm Visual Inspections

- For non-visible pollutant inspections, report on all locations shown in the SWPPP.

Required Actions

- All requiring actions reported on this form must also be reported on Form CEM-2035, "Stormwater Site Inspection Report Corrective Actions Summary."
- Locations identified where BMPs are failing or have other shortcomings require implementation of repairs or design changes within 72 hours of identification, and complete BMP repairs or other charges as soon as possible.

For Information Only

ALAMEDA COUNTY STORMWATER BEST MANAGEMENT STATUS REPORT

Construction General Permit Order No. 2009-0009 DWQ

CEM-2034 (NEW 1/2011)

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PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM	
	PROJECT IDENTIFIER NUMBER	
	WDID NUMBER	
CONTRACT OR NAME AND ADDRESS	PROJECT SITE RISK LEVEL ☐ Risk Level 1 ☐ Risk Level 2 ☐ Risk Level 3	
Water pollution control manager	Signature	Date
Submitted by contractor	Signature	Date

Provide a weekly list of stormwater best management practices on the stormwater pollution prevention plan that are active on the project site.

No	Stormwater Best Management Practices Status			
1	Location	Disturbed soil area _____ acres	Active disturbed soil area _____ acres	Inactive disturbed soil area _____ acres
	BMP Name	BMP ID	Quantity Installed To Date	Quantity to be Installed Next Week
2	Location	Disturbed soil area _____ acres	Active disturbed soil area _____ acres	Inactive disturbed soil area _____ acres
	BMP Name	BMP ID	Quantity Installed To Date	Quantity to be Installed Next Week

ALAMEDA COUNTY STORMWATER BEST MANAGEMENT STATUS REPORT

CEM-2034 (NEW 1/2011)

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PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

No	Stormwater Best Management Practices Status, continued			
—	Location	Disturbed soil area _____ acres	Active disturbed soil area _____ acres	Inactive disturbed soil area _____ acres
	BMP Name	BMP ID	Quantity Installed To Date	Quantity to be Installed Next Week
—	Location	Disturbed soil area _____ acres	Active disturbed soil area _____ acres	Inactive disturbed soil area _____ acres
	BMP Name	BMP ID	Quantity Installed To Date	Quantity to be Installed Next Week

ALAMEDA COUNTY STORMWATER BEST MANAGEMENT STATUS REPORT

CEM-2034 (NEW 1/2011)

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PROJECT INFORMATION NAME AND SITE ADDRESS		CONTRACT NUMBER/CO/RTE/PM		
		PROJECT IDENTIFIER NUMBER		
		WDID NUMBER		

No	Stormwater Best Management Practices Status, continued			
_____	Location	Disturbed soil area _____ acres	Active disturbed soil area _____ acres	Inactive disturbed soil area _____ acres
	BMP Name	BMP ID	Quantity Installed To Date	Quantity to be Installed Next Week
_____	Location	Disturbed soil area _____ acres	Active disturbed soil area _____ acres	Inactive disturbed soil area _____ acres
	BMP Name	BMP ID	Quantity Installed To Date	Quantity to be Installed Next Week
_____	Location	Disturbed soil area _____ acres	Active disturbed soil area _____ acres	Inactive disturbed soil area _____ acres
	BMP Name	BMP ID	Quantity Installed To Date	Quantity to be Installed Next Week
_____	Location	Disturbed soil area _____ acres	Active disturbed soil area _____ acres	Inactive disturbed soil area _____ acres
	BMP Name	BMP ID	Quantity Installed To Date	Quantity to be Installed Next Week

STORMWATER BEST MANAGEMENT STATUS REPORT

CEM-2034 (NEW 9/2010)

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General Information

- The water pollution control manager must oversee preparation of the best management practices status report and submit a copy of the BMP status report weekly.
- Attach additional copies of page 2 and page 3 of this form to include all required locations.
- Insert consecutive numbers for each location when using page 2 or page 3 of this form.

BMP Name	BMP ID	Quantity Installed	Total Required
Temporary Erosion Controls		Non-Stormwater Management	
Preservation of existing vegetation	EC-02	Water conservation practices	NS-01
Hydraulic mulch	EC-03	Dewatering operations	NS-02
Hydroseeding	EC-04	Paving and grinding operations	NS-03
Soil binders	EC-05	Temporary stream crossing	NS-04
Straw mulch	EC-06	Clear water diversion	NS-05
Geotextiles, mats, plastic covers, and lined ditches	EC-07	Illegal connection or discharge detection and reporting	NS-06
Wood mulching	EC-08	Potable water and irrigation	NS-07
Earth dikes, drainage swales and lined ditches	EC-09	Vehicle and equipment cleaning	NS-08
Outlet protection and velocity dissipation devices	EC-10	Vehicle and equipment fueling	NS-09
Slope drains	EC-11	Vehicle and equipment maintenance	NS-10
Streambank stabilization	EC-12	Pile-driving operations	NS-11
Temporary Sediment Control		Concrete curing	NS-12
Silt fence	SC-01	Material and equipment use over water	NS-13
Sediment or distilling basin	SC-02	Concrete finishing	NS-14
Sediment trap	SC-03	Structure demolition or removal over or adjacent to water	NS-15
Check dams	SC-04	Waste Management and Pollution Control	
Fiber rolls	SC-05	Material delivery and storage	WM-01
Gravel bag berm	SC-06	Material use	WM-02
Sandbag barrier	SC-07	Stockpile management	WM-03
Straw bale barrier	SC-09	Spill prevention and control	WM-04
Storm drain inlet protection	SC-10	Solid waste management	WM-05
Wind Erosion Control		Hazardous waste management	WM-06
Wind erosion control	WE-01	Contaminated soil management	WM-07
Tracking Controls		Concrete waste management	WM-08
Stabilized construction entrance and exit	TC-01	Sanitary or septic waste management	WM-09
Stabilized construction roadway	TC-02	Liquid waste management	WM-10
Entrance and exit tire wash	TC-03		
Street sweeping	SC-07		

ALAMEDA COUNTY STORMWATER SITE INSPECTION CORRECTIVE ACTIONS REPORT

Construction General Permit Order No. 2009-0009 DWQ

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PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM	
	PROJECT IDENTIFIER NUMBER	
	WDID NUMBER	
CONTRACT OR NAME AND ADDRESS	PROJECT SITE RISK LEVEL ☐ Risk Level 1 ☐ Risk Level 2 ☐ Risk Level 3	
Submitted by contractor (print and sign name)		Date

Implement required actions identified in a Stormwater Site Inspection Report Summary as soon as possible, but actions must begin within 72 hours of the site inspection.

Corrective action number	Verification of Stormwater Site Inspection Corrective Actions		
1	BMP Type		Location
	Required Action		Comments
	Date Completed	Verified by (print name)	Verified by (signature)
2	BMP Type		Location
	Required Action		Comments
	Date Completed	Verified by (print name)	Verified by (signature)
3	BMP Type		Location
	Required Action		Comments
	Date Completed	Verified by (print name)	Verified by (signature)
4	BMP Type		Location
	Required Action		Comments
	Date Completed	Verified by (print name)	Verified by (signature)
5	BMP Type		Location
	Required Action		Comments
	Date Completed	Verified by (print name)	Verified by (signature)
6	BMP Type		Location
	Required Action		Comments
	Date Completed	Verified by (print name)	Verified by (signature)

ALAMEDA COUNTY STORMWATER SITE INSPECTION CORRECTIVE ACTIONS REPORT

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PROJECT INFORMATION NAME AND SITE ADDRESS		CONTRACT NUMBER/CO/RTE/PM	
		PROJECT IDENTIFIER NUMBER	
		WDID NUMBER	

Corrective action number	Verification of Stormwater Site Inspection Corrective Actions		
	BMP Type		Location
	Required Action		Comments
	Date Completed	Verified by (print name)	Verified by (signature)
	BMP Type		Location
	Required Action		Comments
	Date Completed	Verified by (print name)	Verified by (signature)
	BMP Type		Location
	Required Action		Comments
	Date Completed	Verified by (print name)	Verified by (signature)
	BMP Type		Location
	Required Action		Comments
	Date Completed	Verified by (print name)	Verified by (signature)
	BMP Type		Location
	Required Action		Comments
	Date Completed	Verified by (print name)	Verified by (signature)
	BMP Type		Location
	Required Action		Comments
	Date Completed	Verified by (print name)	Verified by (signature)
	BMP Type		Location
	Required Action		Comments
	Date Completed	Verified by (print name)	Verified by (signature)

ALAMEDA COUNTY STORMWATER SITE INSPECTION CORRECTIVE ACTIONS REPORT

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PROJECT INFORMATION NAME AND SITE ADDRESS	CONTRACT NUMBER/CO/RTE/PM
	PROJECT IDENTIFIER NUMBER
	WDID NUMBER

Stormwater Site Inspection Report Corrective Action Summary Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the people who manage the system or are directly responsible for gathering the information, the information submitted is true, accurate, and complete to the best of my knowledge and belief. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment of knowing violations.

Water pollution control manager	Date

Water pollution control manager signature

Stormwater Site Inspection Report Corrective Action Summary Acceptance

Resident engineer name	Date

Resident engineer signature

General Information

- CGP Attachments C, D, and E, Section G., 5., g require the information on this form.
- If the summary form does not have enough lines to report all actions required on CEM-2035 "Stormwater Site Inspection Report," use additional copies of this form's page 2 to report all required corrective actions from an inspection form.
- On page 2 of this form and additional copies of page 2, insert consecutive numbers for each required corrective action.

Required Actions

- Identified locations where BMPs are failing or have other shortcomings require repairs or design changes within 72 hours of identification and complete BMP repairs or other changes as soon as possible.
- Comments must be provided when the required action is changed from the Stormwater Site Inspection Report.

APPENDIX F

Information Handout F: Sustainable Design Guide Project Checklist

Reference: Section [14-1.03](#) Sustainable Design Strategy

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APPENDIX F

Sustainable Design Guide

Alameda County Public Works Agency

Project Checklist

Did you:	Yes	No
1. Use recycled water for dust control and/or irrigation operations?		
2. Use energy-efficient materials (other than those specified in the project plans and special provisions)?		
3. Use Virtual Project Manager or recycled paper for submittals?		
4. Use recycled motor oil where applicable?		
5. Use recycled-content materials?		
6. Use materials manufactured in the United States?		
7. Use local vendors located in Alameda County?		
8. Recycle packaging waste?		
9. Comply with the Construction & Demolition requirements?		

If you answered “no” to any of the questions above, please briefly explain why. Also describe any challenges you may have faced in accomplishing sustainability:

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

Contractor's Signature

Date _____

APPENDIX G

Information Handout G: Construction and Demolition Debris Form

Reference: Section [14-10.02](#) Solid Waste Disposal and Recycling

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APPENDIX G

Construction and Demolition Debris Management Plan And Recycling Summary Report

Alameda County Public Works Agency

Instructions:

Management Plan:

The Notice to Proceed will not be issued unless the Management Plan section is submitted by the Engineer.

Estimate quantities for each type of material to be diverted or landfilled in the tables provided. For each material, list the diversion method and vendor or facility receiving the materials. A list of conversion factors is provided for your use in estimating quantities. Use additional sheets if necessary. Submit all weight tickets documenting tons recycled or landfilled. Keep copies of this form and the weight tickets for submission upon completion of project. Information regarding recyclable materials and available facilities can be obtained by calling the Alameda County Recycling Hotline at (877) 786-7927 or by visiting the Alameda County Waste Management Authority website at www.stopwaste.org.

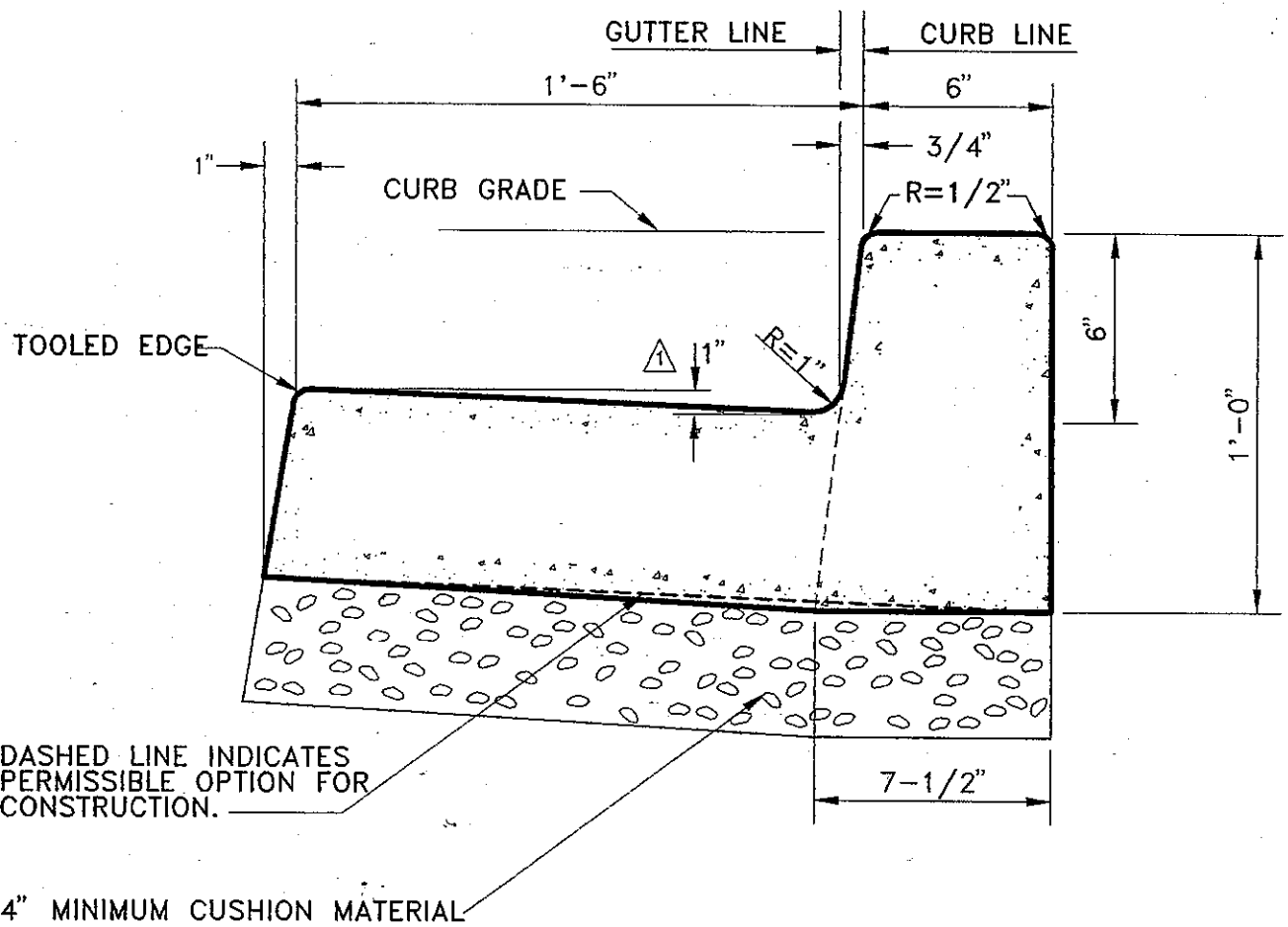
Recycling Summary Report:

The Project will not be accepted by the Engineer unless the Recycling Report section is submitted to and approved by the Engineer.

The form must show diversion of all waste listed on the Construction and Demolition Debris Management Plan of the Project. List actual quantities of waste for each material type in each column, specifying the method of diversion used. If no materials were targeted for recycling, reuse or salvage, please state why on the reverse side of this form. Weight tickets for all quantities recycled, salvaged, and landfills are required.

APPENDIX H

Information Handout H: ACPWA Standard Details

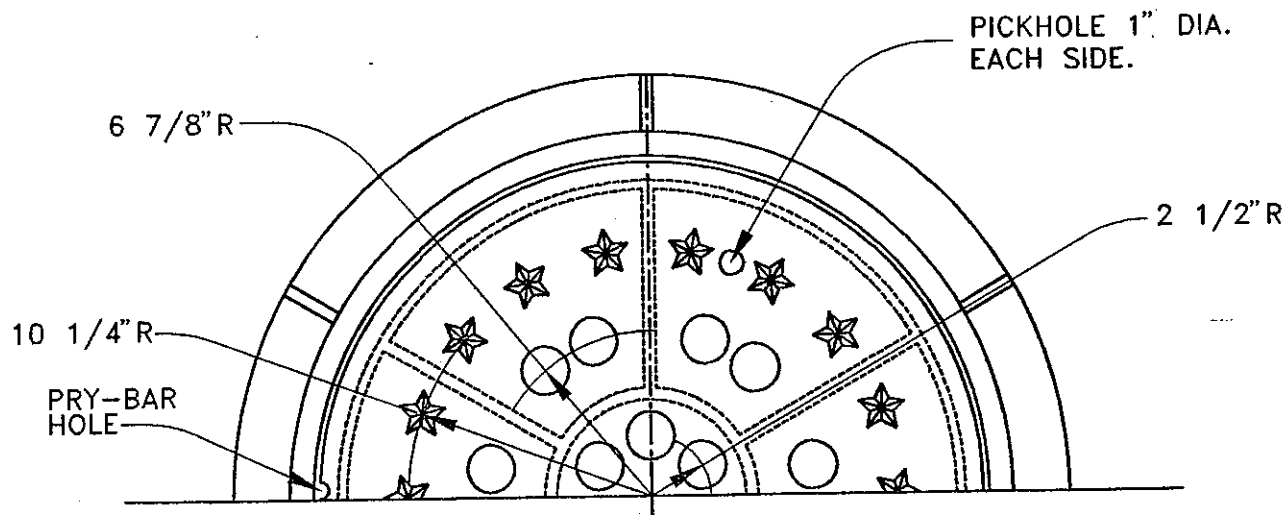


P.C.C. CURB AND GUTTER AREA = 1.292 SQ. FT.

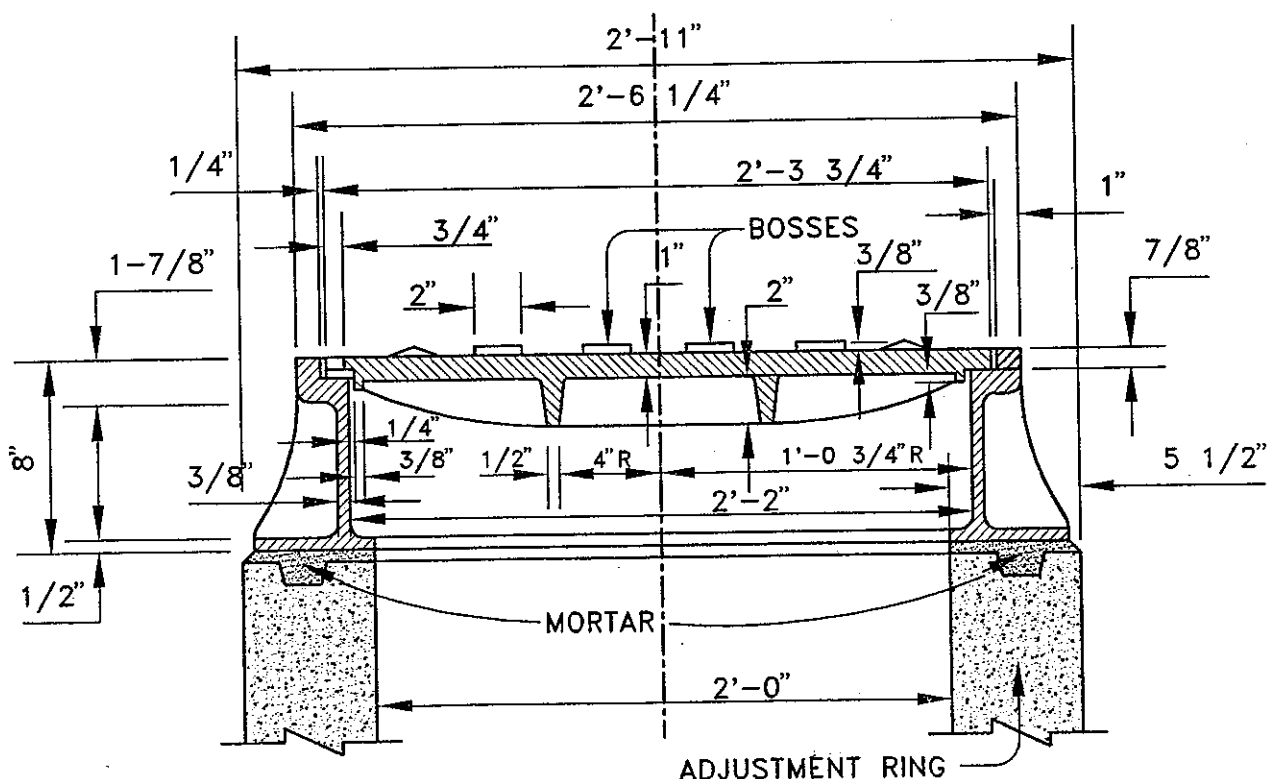
COUNTY OF ALAMEDA ★ PUBLIC WORKS AGENCY

						APPROVAL REC.	
						APPROVED <i>[Signature]</i>	
						APPROVED <i>[Signature]</i>	
△ RELOCATED DIMENSION		EA				COUNTY ENGINEER AND COUNTY SURVEYOR	
REVISIONS						FILE NO.	
DRAWN JPB		CHECKED		DATE June 1992		SCALE None	
						SD-300 1 of 1	

P.C.C. CURB AND GUTTER



HALF PLAN OF TOP



SECTION

NOTE:

MANHOLE FRAMES AND COVERS SHALL BE MATCH-MARKED IN PAIRS. EACH COVER SHALL BE GROUND OR OTHERWISE FINISHED SO THAT IT WILL FIT IN ITS FRAME WITHOUT ROCKING.

COUNTY OF ALAMEDA ★ PUBLIC WORKS AGENCY

MANHOLE CASTING

APPROVAL REC.
Hank Ackerman
 APPROVED
J. Swanson
 APPROVED
C. W. Wain
 CM

COUNTY ENGINEER

REVISIONS

DRAWN

KT

CHECKED

DATE

JAN. 1994

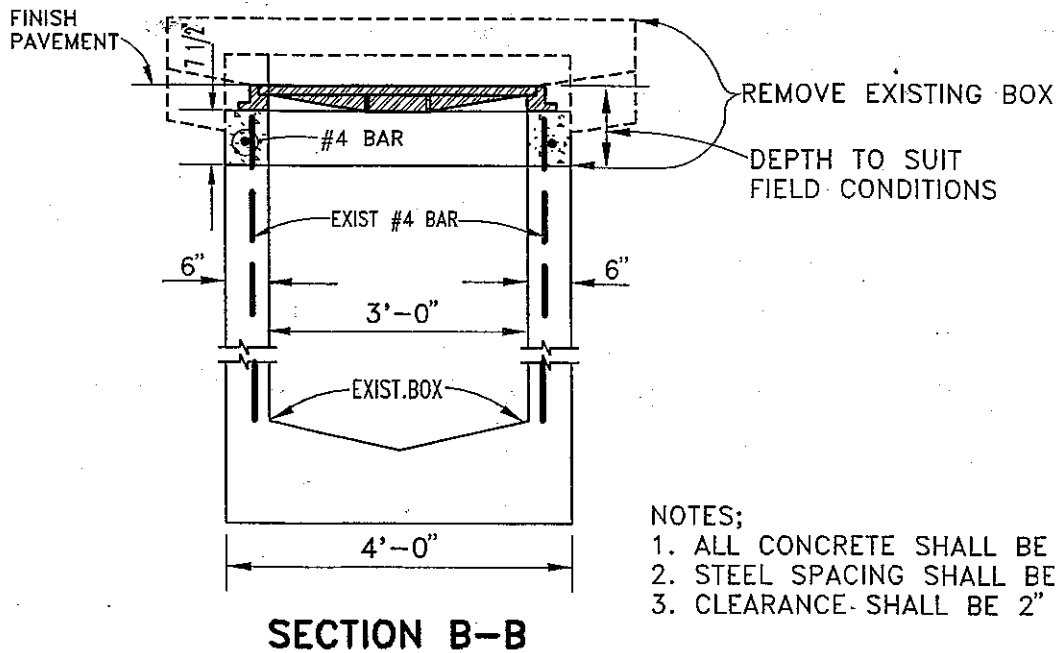
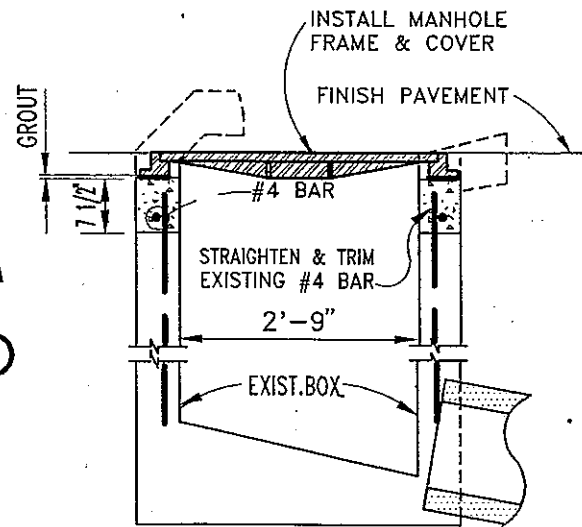
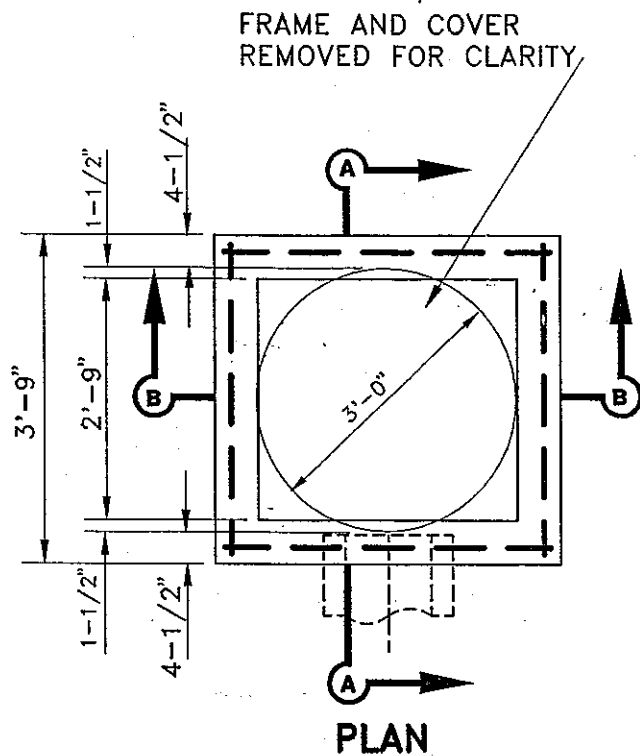
SCALE

NONE

FILE NO.

SD-409

1 of 1



- NOTES;
1. ALL CONCRETE SHALL BE CLASS "A"
 2. STEEL SPACING SHALL BE 1-1/2" MIN.
 3. CLEARANCE SHALL BE 2" MIN.

COUNTY OF ALAMEDA ★ PUBLIC WORKS AGENCY

CONVERT EXISTING
DROP INLET TO MANHOLE

APPROVAL REC.

APPROVED
Andrews

APPROVED
awm

COUNTY ENGINEER

REVISIONS

DRAWN

EA

CHECKED

DATE

JUNE 1993

SCALE

NONE

FILE NO.

SD-422

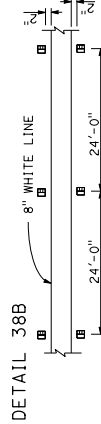
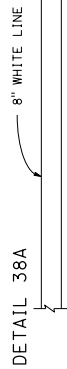
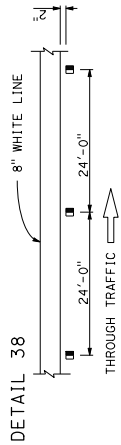
1 of 1

APPENDIX I

Information Handout I: Caltrans Standard Plans

12

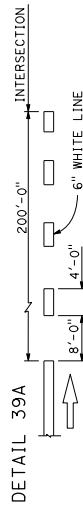
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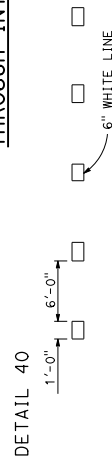
BIKE LANE



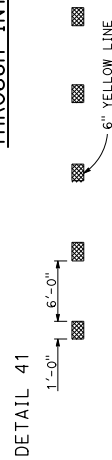
INTERSECTION BIKE LANE



LANE LINE EXTENSIONS THROUGH INTERSECTIONS

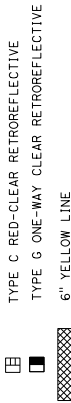


CENTER LINE EXTENSIONS THROUGH INTERSECTIONS

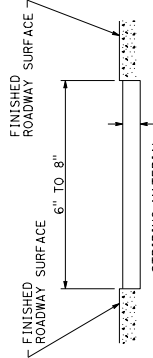
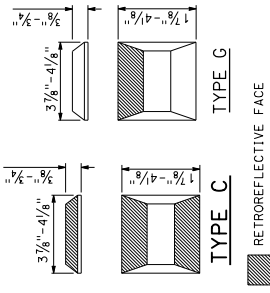


LEGEND

MARKERS



MARKER DETAILS



DETAIL FOR RECESSED TRAFFIC STRIPE

See Notes A and B.

RECESSED NOTES:

- See typical traffic line details for pavement marking patterns.
- See standard specifications for recess depth and recess striping material thickness.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTALS NO. SHEETS

REGISTERED CIVIL ENGINEER

October 19, 2018

NO. CB0402

DATE 3-31-19

THE STATE OF CALIFORNIA DATE 175 OFFICERS

ON AGENTS SHALL NOT BE RESPONSIBLE FOR

COMPLETION OF THIS PLAN SHEET.

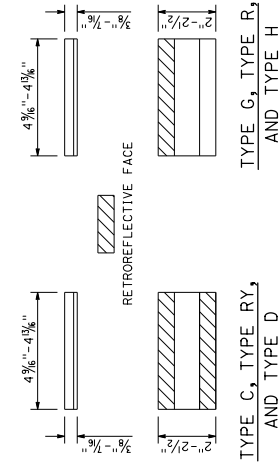
STATE OF CALIFORNIA

TO ACCOMPANY PLANS DATED _____



RECESS DETAIL FOR RETROREFLECTIVE PAVEMENT MARKER

See Note 4



RETRORREFLECTIVE PAVEMENT MARKER FOR RECESSED INSTALLATION

See Notes 1 and 2.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

PAVEMENT MARKERS AND TRAFFIC LINES TYPICAL DETAILS

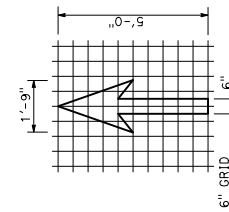
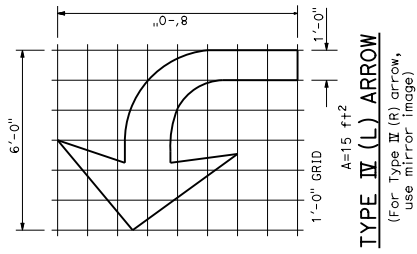
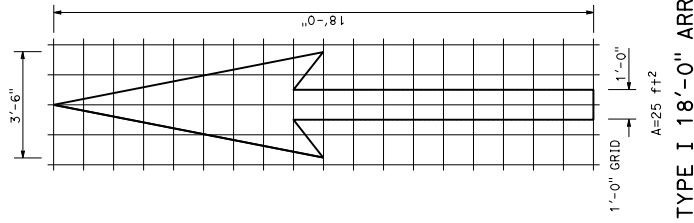
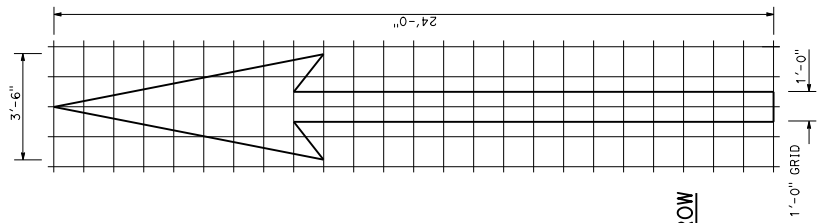
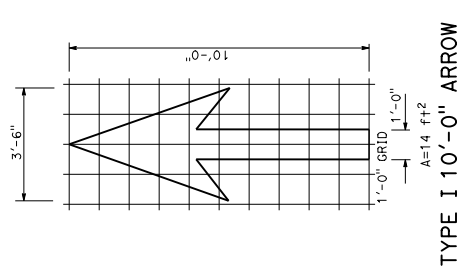
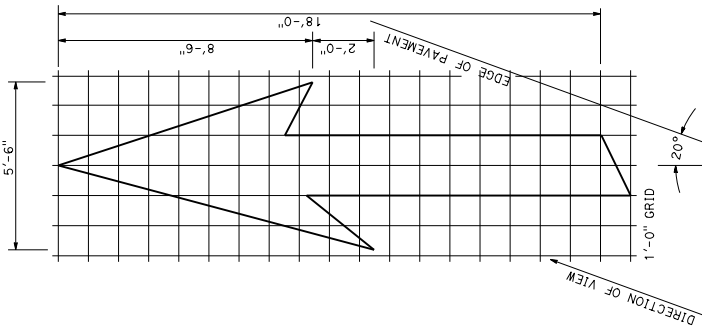
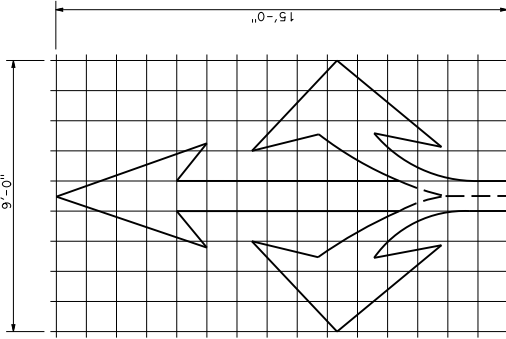
NO SCALE

RSP A20D DATED OCTOBER 19, 2018 SUPERSEDES STANDARD PLAN A20D
DATED MAY 31, 2018 - PAGE 15 OF THE STANDARD PLANS BOOK DATED 2018.

REVISED STANDARD PLAN RSP A20D

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL NO. SHEETS

REGISTERED CIVIL ENGINEER May 31, 2018 PLANS FOR THE THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.	



NOTE:
Minor variations in dimensions
may be accepted by the Engineer.

TYPE I ARROW
A=33 ft±

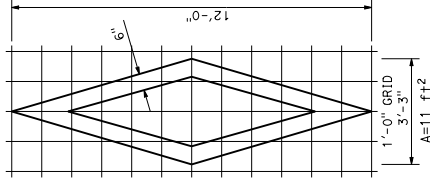
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
**PAVEMENT MARKINGS
ARROWS**
NO SCALE

A24A

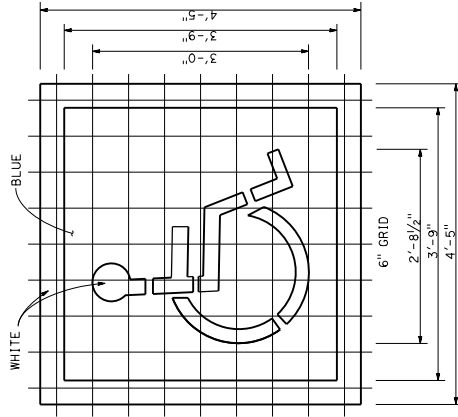
DIST	COUNTY	ROUTE	POST MILES	SHEET TOTAL
			TOTAL PROJECT	NO. SHEETS

MAY 31, 2018 REGISTERED CIVIL ENGINEER	PROJECT NO. 33119 THE STATE OF CALIFORNIA OR ITS OFFICERS OR AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF SCANNED COPIES OF THIS PLAN SHEET.

NOTE:
Minor variations in dimensions may be accepted by the Engineer.

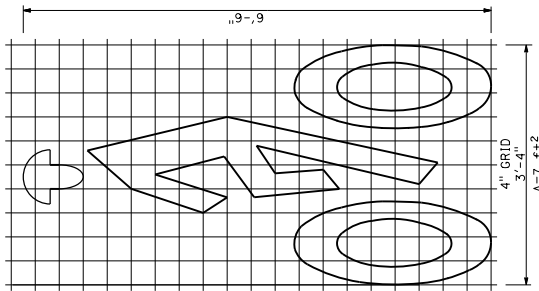


DIAMOND SYMBOL

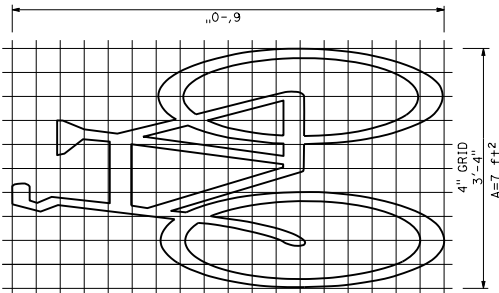


A (WHITE) = 9 ft+2
A (BLUE) = 14 ft+2

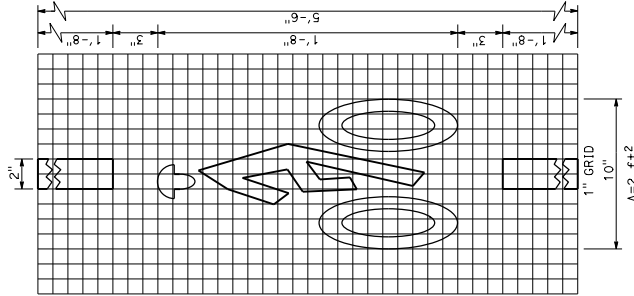
**INTERNATIONAL SYMBOL
OF ACCESSIBILITY (ISA) MARKING**



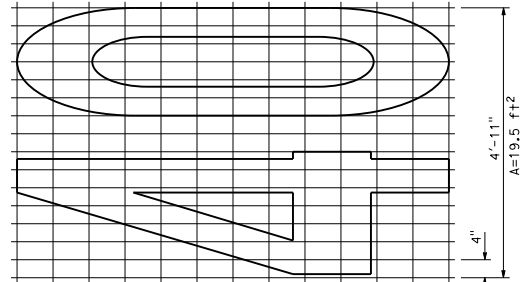
**BIKE LANE SYMBOL
WITH PERSON**



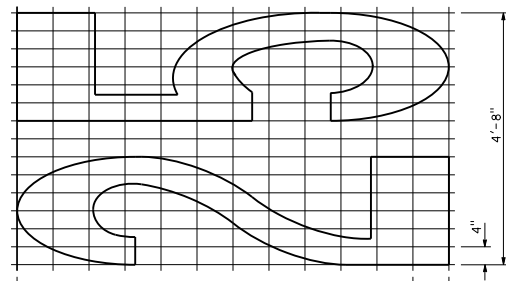
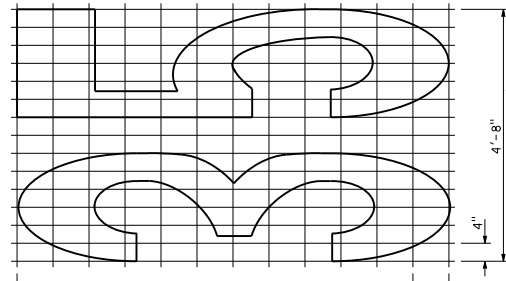
**BIKE LANE SYMBOL
WITHOUT PERSON**



**BIKE LOOP
DETECTOR SYMBOL**



NUMERALS



SHARED ROADWAY BICYCLE MARKING

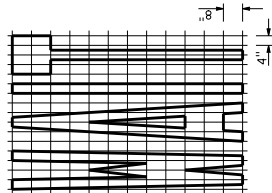
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
**PAVEMENT MARKINGS
SYMBOLS AND NUMERALS**

NO SCALE

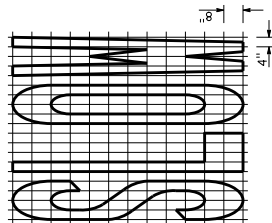
A24C

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL NO. SHEETS

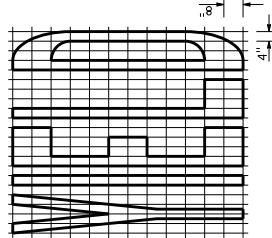
	
REGISTERED CIVIL ENGINEER May 31, 2018 BUREAU OF HIGHWAYS THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION ALL AGENTS SHALL NOT BE RESPONSIBLE FOR THE ACCURACY OR COMPLETENESS OF THE SCANNED COPIES OF THIS PLAN SHEET.	



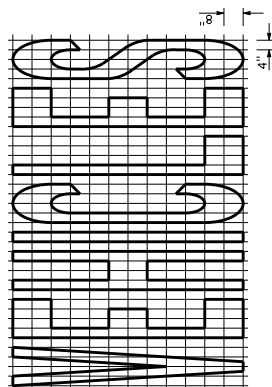
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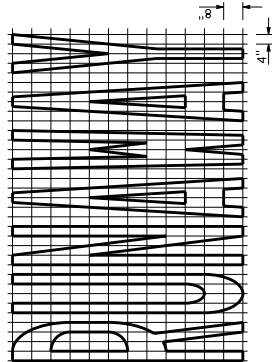
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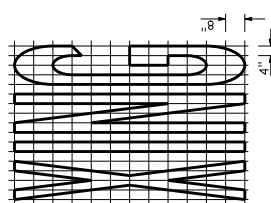
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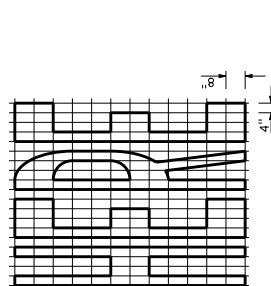
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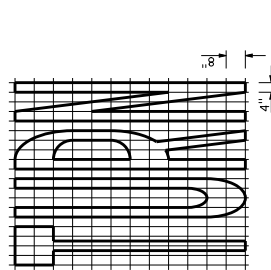
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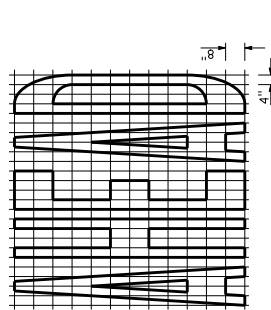
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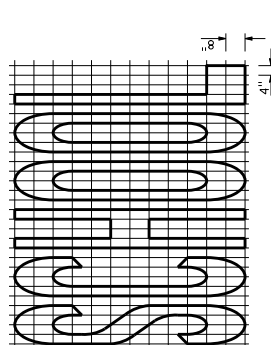
A=26 f+2



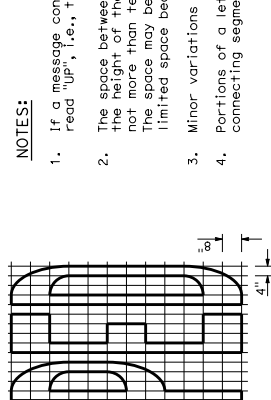
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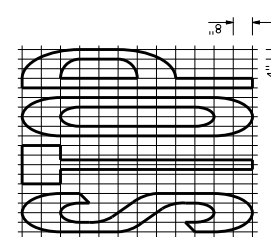
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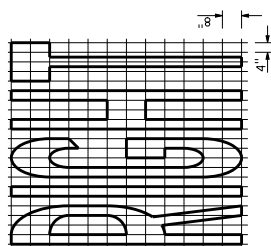
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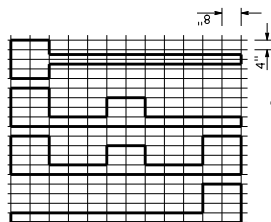
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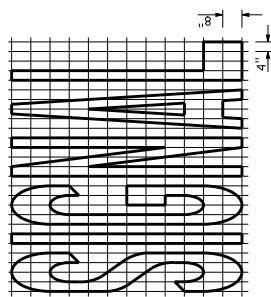
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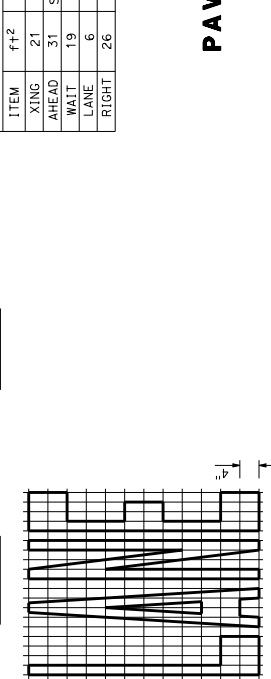
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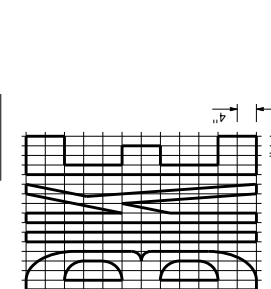
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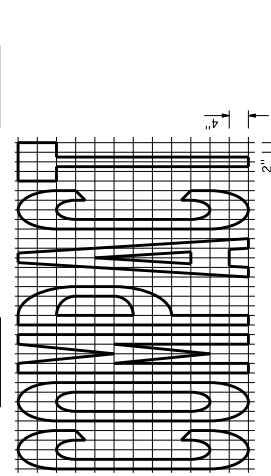
A=32 f+2



A=6 f+2



A=5 f+2



A=10 f+2

NOTES:

1. If a message consists of more than one word, it must read "up", i.e., the first word must be nearest the driver.
2. The space between words must be at least four times the height of the characters for low speed roads, but not more than ten times the height of the characters. The space may be reduced appropriately where there is limited space because of local conditions.
3. Minor variations in dimensions may be accepted by the Engineer.
4. Portions of a letter, number or symbol may be separated by connecting segments not to exceed 2' in width.

WORD MARKINGS					
ITEM	f+2	ITEM	f+2	ITEM	f+2
XING	21	YIELD	24	BIKE	5
AHEAD	31	SCHOOL	35	SLOW	23
WAIT	19	SIGNAL	32	STOP	22
LANE	6	TURN	24	LEFT	19
RIGHT	26	HERE	26	VEHICLES	42

 STATE OF CALIFORNIA
 DEPARTMENT OF TRANSPORTATION

PAVEMENT MARKINGS WORDS

NO SCALE

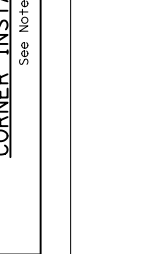
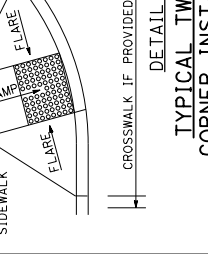
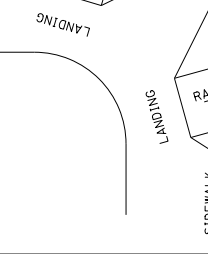
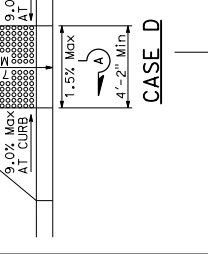
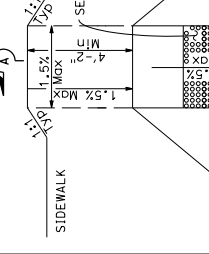
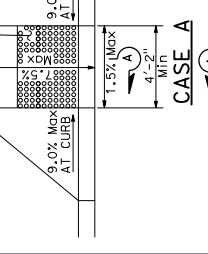
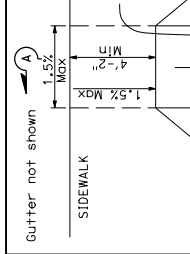
A 24D

0.45" Min AND 0.47" Max
TOP Dia

0.9" Min AND 0.92" Max
BASE Dia

0.2

RAISED TRUNCATED DOME



See Note 1

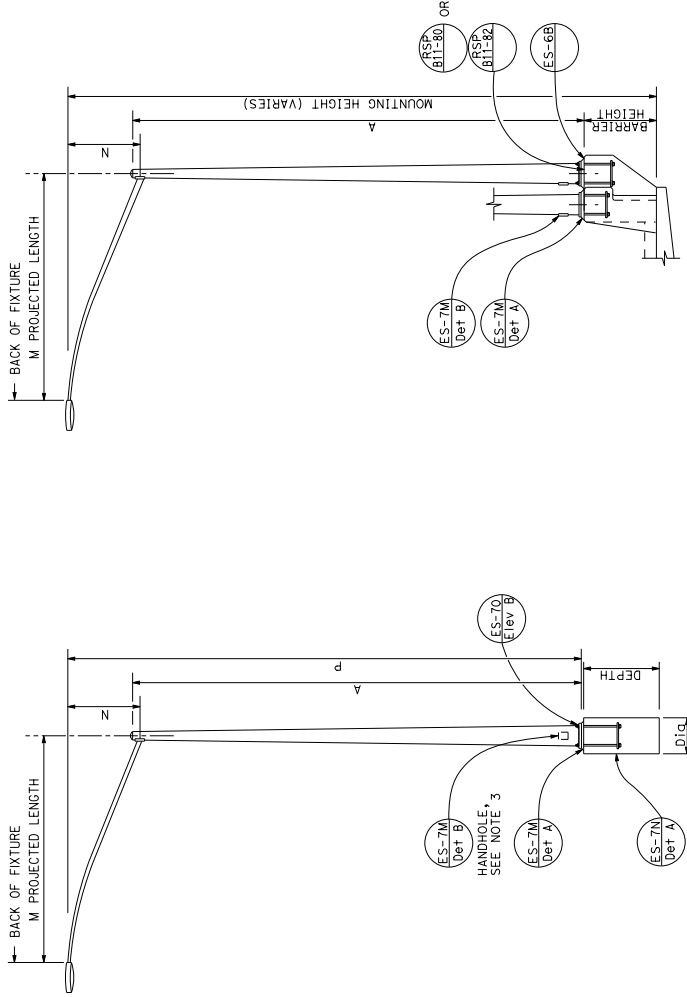
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DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET TOTAL NO. SHEETS

REGISTERED CIVIL ENGINEER
October 18, 2019
PLANS APPROVED FOR ITS OFFICERS
BY AGENTS SHALL NOT BE RESPONSIBLE FOR
THE ACCURACY OF THE INFORMATION OR THE
CORRECTNESS OF THIS PLAN SHEET.

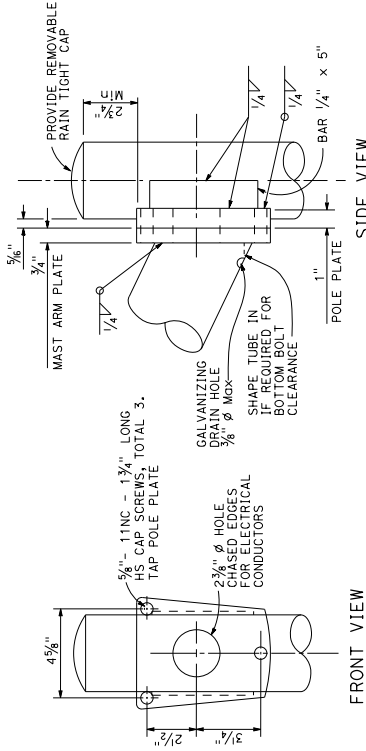
THE STATE OF CALIFORNIA
NO. 037793
EXPI. 3-31-20
STATE OF CALIFORNIA
REGISTERED CIVIL ENGINEER

TO ACCOMPANY PLANS DATED

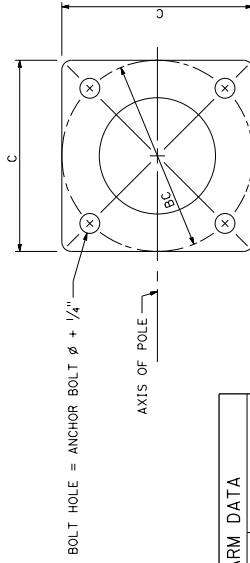


TYPE 15 AND TYPE 21 BARRIER RAIL MOUNTED
ELEVATION B

TYPE 15 AND TYPE 21
ELEVATION A



LUMINAIRE MAST ARM CONNECTION
DETAIL R



BASE PLATE
DETAIL A

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**ELECTRICAL SYSTEMS
(LIGHTING STANDARD,
TYPES 15 AND 21)**

NO SCALE

RSP ES-6A DATED OCTOBER 18, 2019 SUPERSEDES STANDARD PLAN ES-6A
DATED MAY 31, 2018 - PAGE 508 OF THE STANDARD PLANS BOOK DATED 2018.

REVISED STANDARD PLAN RSP ES-6A

POLE TYPE	POLE DATA				BASE PLATE DATA			CIDH PILE FOUNDATION		
	A HEIGHT	Min OD BASE	TOP	WALL THICKNESS	BC = BOLT CIRCLE	C	THICKNESS	ANCHOR BOLT SIZE	DiA	DEPTH
15	30'-0"	8"	3 3/4"	0.1196"	1'-0"	1'-0"	1 1/2"	1" Ø x 36" *	2'-6"	6'-0"
21	35'-0"	8 5/8"	3 3/4"	0.1793"	1'-0"	1'-0"	2"	1 1/4" Ø x 36" *	2'-6"	7'-0"

* FOR BARRIER RAIL BOLTS, SEE STANDARD PLAN ES-6B.

NOTES:

1. Indicates mast arm length to be used unless otherwise noted on the plans.
2. For Type 15-SB, use Type 15 standard with Type 30 slip base plate details, see Standard Plan ES-6F.
3. Handhole shall be located on the downstream side of traffic.
4. For additional notes and details, see Standard Plans ES-7M and ES-7N.

Information Handout J: Sample Temporary “No Parking” Sign

TOW—AWAY

NO

**PARKING
ANYTIME**

FROM _____ TO _____

FOR TOWED VEHICLES

CALL 667-7721

ALAMEDA CO. ORD. CODE

SECTION 6-200.0

APPENDIX K

Information Handout K: Utility Locating Pothole Depth Report



UTILITY LOCATING
POTHOLE DEPTH REPORT
BTL 12-0-1266

SPECIALLY PREPARED FOR:



PROJECT SITE:

Greenville Place
Castro Valley, California

TABLE OF CONTENTS

1. Project Description
2. Project Map
3. Tabulation
4. Record of Test Hole Date Sheets

Bess Testlab Inc.
2463 Tripaldi Way
Hayward, CA 94545
Submitted By: Michael Bohorquez
Office: (408) 988-0101
Email: Michael@besstestlab.com



Hayward (Corporate) | Fresno | Los Angeles | T. (408) 988-0101 | F. (408) 988-0103
Utility Locating - Ground Penetrating Radar (GPR) - Electromagnetic Pipe Locators
Structural Concrete Scanning - Potholing Vacuum Excavation - CCTV Pipe Inspection
Mobile LiDAR Scanning - 3D Scanning - 3D Utility Mapping - www.besstestlab.com

March 25, 2020

Attention: BKF Engineers

Reference: Greenville Place, Castrovalley, Ca

Project Summary

BESS performed five (5) vacuum excavation potholes at predetermined locations. Please see attached data sheets for details.

BESS Crew

SUE Foreman: Spencer Ama

Vacuum Excavation Technical Approach

Vacuum excavation is done by using air/hydro-vacuum excavation at predetermined locations over USA marks, to document the precise horizontal and vertical position of existing utilities within the investigation area. Data collected as a result of these potholing activities were presented in this Portable Document Format (PDF) report that includes: utility type, size, material, depth and pictures of the exposed utility. Pothole locations (in the field) were marked with wooden lath and ribbon, that was with the pothole number, utility size and depth or MAG nail with pertinent utility data annotated on the ground surface. Once the utility data has been collected the potholes were restored to its previous condition using native backfill and the appropriate surface restoration materials.

Electronic Pothole/Probing (EP) Technical Approach

An electronic pothole (EP) investigation is an electronic depth estimate done by using industry acceptable methods (i.e., electronic pipe and cable locating equipment, Ground Penetrating Radar (GPR), Pipeline Current Mapper (PCM), etc.) to determine the approximate horizontal position and count of existing utilities within the areas designated. BESS field crews will use a combination of water-based paint and pin flags (in the appropriate APWA color) to mark the results of our investigation on the ground surface. BESS will compare any available utility record information (supplied by client) with the results of field investigation services to ensure all utilities have been accounted for. Pictures of investigation are also taken and reported.

If you have any questions or need additional information, please feel free to contact me.

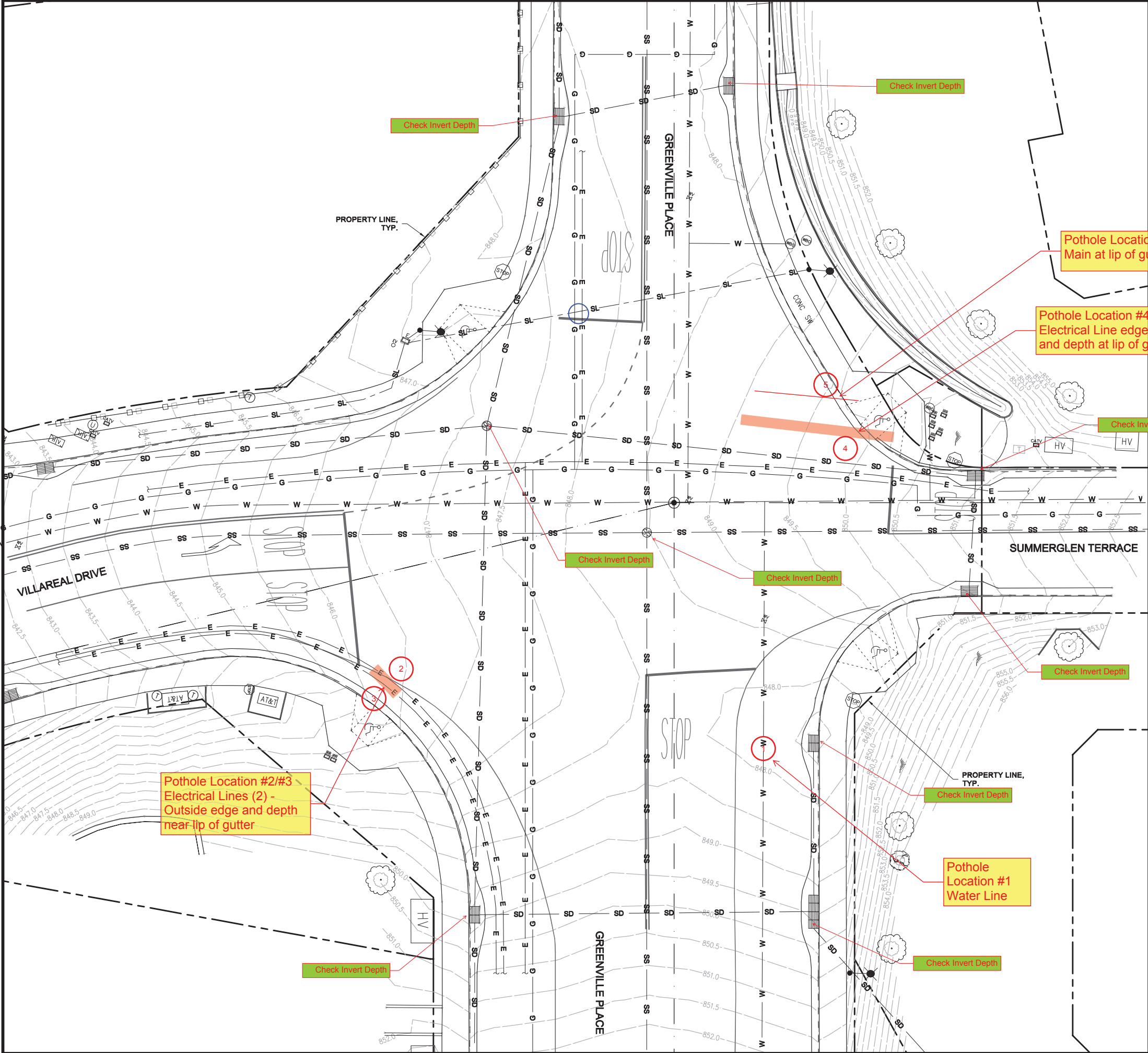
Respectfully,

A handwritten signature in black ink that reads "Michael Bohorquez".

Michael Bohorquez
Project Manager
Bess Testlab, Inc.
(408) 988-0101

REVIEWED BY:	DATE:	REVIEWED BY:	DATE:
CONSTRUCTION		SURVEY	
MAINTENANCE		TRAFFIC	
REAL ESTATE		ENVIRONMENTAL	

K:\2016\165001_Alameda-County\ENG\Sheets\Greenville\05_EX.dwg 3-12-18 08:10:40 AM kled



EXISTING LEGEND:

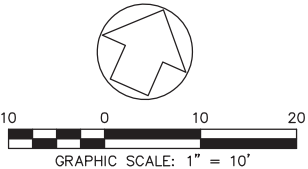
- PROPERTY LINE
- CONTROL LINE
- MONUMENT
- CONTOUR ELEVATION
- WATER PIPE
- SEWER PIPE
- STORM DRAIN PIPE
- LANDSCAPING
- MANHOLE
- SIGN POST
- STORM DRAIN INLET
- STREET LIGHT
- UTILITY BOX
- UTILITY VALVE

EXISTING ABBREVIATIONS:

- CONC CONCRETE
- HV HIGH VOLTAGE
- IRR IRRIGATION
- SD STORM DRAIN
- SS SANITARY SEWER
- SW SIDEWALK
- W WATER
- WV WATER VALVE

EXISTING NOTES:

- UTILITIES SHOWN ARE BASED ON RECORD INFORMATION OBTAINED BY MULTIPLE SOURCES. CONTRACTOR SHALL VERIFY IN FIELD PRIOR TO CONSTRUCTION AND NOTIFY ENGINEER OF ANY DISCREPANCIES.



REVISIONS

NO.	DESCRIPTION	BY	DATE



BKF
ENGINEERS / SURVEYORS / PLANNERS
1646 N CALIFORNIA BLVD
VALLEJO, CA 94597
925-940-2289 (FAX)
925-940-2200 (TEL)

CHECKED: D. JONSON
DRAWN: D. KLEIN
DESIGNED: D. KLEIN
APPROVED: D. SCHAEFER

COUNTY OF ALAMEDA ☆ PUBLIC WORKS AGENCY

INTERSECTION IMPROVEMENTS AT
GREENVILLE PLACE AND VILLAREAL DRIVE
POTHOLE PLAN
EXISTING CONDITIONS PLAN

DATE	SCALE
MAR 2018	AS NOTED
WORK ORDER NO.	XXX
SPECIFICATION NO.	XX
SHEET NO.	6 OF 10
FILE NO.	20165001

03/12/2020

FOR REDUCED ENGLISH PLANS
ORIGINAL SCALE IS IN INCHES

Date: 3/25/2020
 BTL Job No.: 12-O-1266
 Customer: BKF Engineers

Pothole Tabulation Sheet for BKF Engineering - Greenville

Locating Methods: (PH - Pothole); (GPR - Ground Penetrating Radar); (EP - Electronic Probing via Radio/ RF Detection, Magnetic Detection, PCM and others)

Pothole No.	Locating Method	Utility Type	Utility	Material	Utility Diameter (in)	Soil Type	Paving Type	Paving Thickness (in)	Utility Depth (in)	Notes
PH 1	PH	Water		Steel	12"	Rocks & Dirt	Asphalt	5"	36"	Traveling W to E
PH 2	PH	Communication		PVC	4"	Rocks & Dirt	Asphalt	6"	22"	Traveling W to E. Found comm in same joint trench as PH3
PH 3	PH	A:Gas, B:Elec		A:PVC, B:Plastic	4" both	Rocks & Dirt	Asphalt	6"	A:48" B:29"	A: West to East. Has 3 4" pipes. Can't see the 3rd pipe due to being under gas line B traveling West to East
PH 4	PH	A:Comm B:Elec		PVC both	A:2" B:4"	Rocks & Dirt	Asphalt	5"	A:56" B:53"	Both traveling N to S
PH 5	PH	Gas		Plastic	4"	Rocks & Dirt	Asphalt	5"	66"	Traveling N to S

Form	Bess Utility Solutions -Test Hole Data
Version	12
Project	12-0-1266 - BKF- Greenville Pl
Site	03/20/20
Creator	Spencer Ama
Latitude	37.718339
Longitude	-122.022374
Date	03/20/20 10:30 PM

Utility Data
Test hole No.
1
Utility Type/Owner
Water
Material
Steel
Soil
Dirt,rocks,sand
Pavement Thickness
5" asphalt
Diameter
12"
Ground to top of Utility
36"
Swing Tie 1
199"(E) from center of water valve
Swing Tie 2
122"(S) from face of curb
Swing Tie 3
Notes
Traveling w est to east



Form	Bess Utility Solutions -Test Hole Data
Version	12
Project	12-0-1266 - BKF- Greenville Pl
Site	03/20/20
Creator	Spencer Ama
Latitude	37.718803
Longitude	-122.022180
Date	03/20/20 09:42 PM

Utility Data
Test hole No.
2
Utility Type/Owner
Communication
Material
Pvc
Soil
Dirt, rocks, rocky dirt, clay,sand
Pavement Thickness
6" asphalt
Diameter
4"
Ground to top of Utility
22"
Swing Tie 1
306"(N) from face of curb
Swing Tie 2
552"(E) from center of storm drain manhole
Swing Tie 3
Notes
Traveling w est to east Calling for electric, found communication in same joint trench as PH3. See PH3 data for information



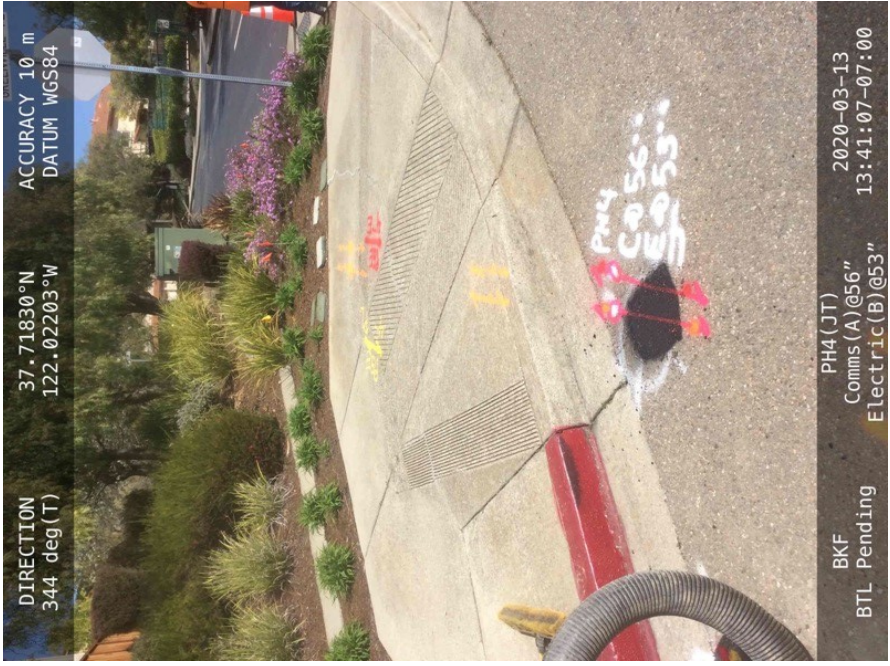
Form	Bess Utility Solutions -Test Hole Data
Version	12
Project	12-0-1266 - BKF- Greenville Pl
Site	03/20/20
Creator	Spencer Ama
Latitude	37.718253
Longitude	-122.022312
Date	03/20/20 09:40 PM

Utility Data
Test hole No.
3 (joint trench)
Utility Type/Owner
Electric (A). Gas-(B)
Material
A-pvc. B-plastic
Soil
Dirt, rocks, rocky dirt, clay,sand
Pavement Thickness
6" asphalt
Diameter
A-4". B-4"
Ground to top of Utility
A-48". B-29"
Swing Tie 1
294"(N) from face of curb
Swing Tie 2
552"(E) from center of storm drain manhole
Swing Tie 3
Notes
A- traveling west to east. Has three 4" pipes. Cannot see third pipe due to being under gas line B-traveling west to east Joint trench



Form	Bess Utility Solutions - Test Hole Data
Version	12
Project	12-0-1266 - BKF- Greenville Pl
Site	03/20/20
Creator	Spencer Ama
Latitude	37.473107
Longitude	-122.136978
Date	03/22/20 11:32 PM

Utility Data
Test hole No.
4
Utility Type/Owner
Communication-A. Electric-B
Material
A-pvc. B-pvc
Soil
Dirt , rocks, sand
Pavement Thickness
5" asphalt
Diameter
A-2". B-4"
Ground to top of Utility
A-56". B-53"
Swing Tie 1
240"(S) from center of irrigation box
Swing Tie 2
346"(E) from center of street light post
Swing Tie 3
Notes
A-traveling north to south B-traveling north to south



Form	Bess Utility Solutions - Test Hole Data
Version	12
Project	12-0-1266 - BKF- Greenville Pl
Site	03/20/20
Creator	Spencer Ama
Latitude	37.473076
Longitude	-122.136617
Date	03/22/20 11:30 PM

Utility Data
Test hole No.
5
Utility Type/Owner
Gas
Material
Plastic
Soil
Dirt, rocky,sand
Pavement Thickness
5" asphalt
Diameter
4"
Ground to top of Utility
66"
Swing Tie 1
265"(S) from center of irrigation box
Swing Tie 2
289"(E) from center of street light post
Swing Tie 3
Notes
Traveling north to south



Form	Manhole Datasheet
Version	6
Project	12-0-1266 - BKF- Greenville Pl
Site	03/20/20
Creator	Spencer Ama
Latitude	38.308698
Longitude	-122.481491
Date	03/25/20 08:38 PM

Manhole Datasheet
Manhole No.
1
Type
Sanitary sewer
Location
Summerglen Terr. And Greenville dr. Castro Valley
Depth to Bottom
123"
Invert 1 Size
2 o'clock, 8" vcp
Invert 1 Depth
109" tp
Invert 1 Direction
NE to SW, flow s towards manhole
Invert 2 Size
7 o'clock, 8" vcp
Invert 2 Depth
115" tp
Invert 2 Direction
NE to SW, flow s away from manhole
Invert 3 Size
10 o'clock, 8" vcp
Invert 3 Depth
112" tp

Invert 3 Direction

W to E, flow s tow ards manhole

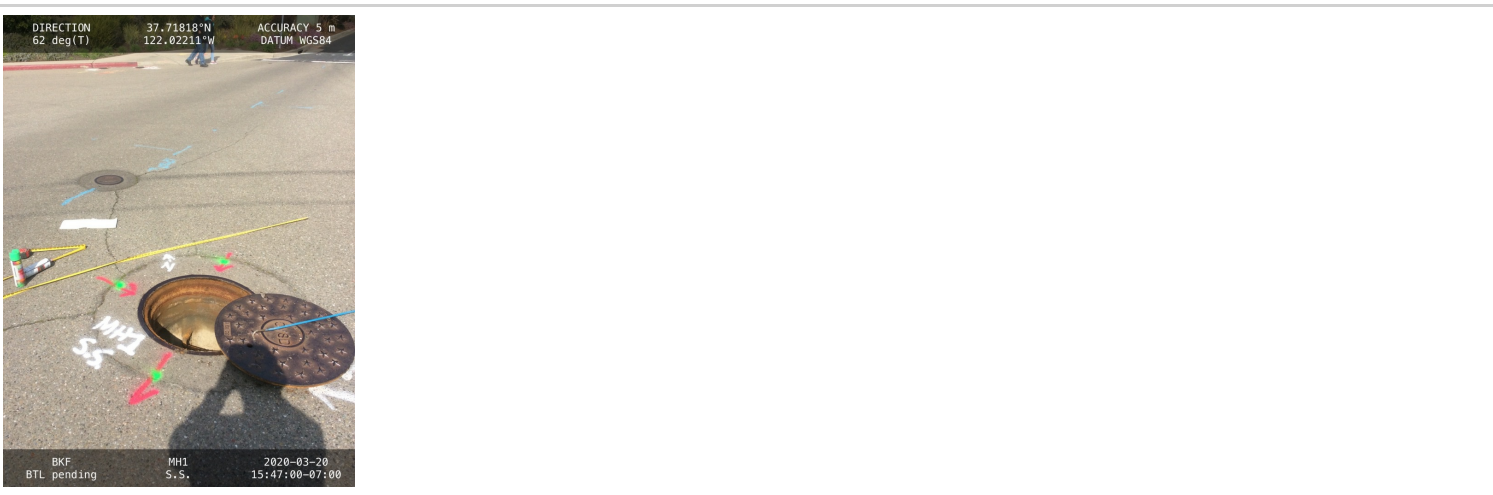
Invert 4 Size

Invert 4 Depth

Invert 4 Direction

Notes

Outside View



Inside View

